Extron® Electronics
INTERFACING, SWITCHING AND DISTRIBUTION

User's Manual

MPX Plus 866 A

Media Presentation Matrix Switcher

68-1193-01 **Rev. B**
05 09

Precautions

Safety Instructions • English

This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.

This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

Caution

Read Instructions • Read and understand all safety and operating instructions before using the equipment.

Retain Instructions • The safety instructions should be kept for future reference.

Follow Warnings • Follow all warnings and instructions marked on the equipment or in the user information.

Avoid Attachments • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

Consignes de Sécurité • Français

Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).

Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

Attention

Lire les instructions• Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.

Conserver les instructions• Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.

Respecter les avertissements • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.

Eviter les pièces de fixation • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

Sicherheitsanleitungen • Deutsch

Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.

Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

Achtung

Lesen der Anleitungen • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits-und Bedienungsanleitungen genau durchlesen und verstehen.

Aufbewahren der Anleitungen • Die Hinweise zur elektrischen Sicherheit des Produktes sollten Sie aufbewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.

Befolgen der Warnhinweise • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.

Keine Zusatzgeräte • Verwenden Sie keine Werkzeuge oder Zusatzgeräte, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

Instrucciones de seguridad • Español

Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.

Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

Precaucion

Leer las instrucciones • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.

Conservar las instrucciones • Conservar las instrucciones de seguridad para futura consulta.

Obedecer las advertencias • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.

Evitar el uso de accesorios • No usar herramientas o accesorios que no sean especificamente recomendados por el fabricante, ya que podrian implicar riesgos.

安全须知 • 中文

这个符号提示用户该设备用户手册中有重要的操作和维护说明。

这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

注意

阅读说明书 • 用户使用该设备前必须阅读并理解所有安全和使用说明。

保存说明书 • 用户应保存安全说明书以备将来使用。

遵守警告 • 用户应遵守产品和用户指南上的所有安全和操作说明。

避免追加 • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

Warning

Power sources • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.

Power disconnection • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).

Power cord protection • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.

Servicing • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.

Slots and openings • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.

Lithium battery • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Avertissement

Alimentations• Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayez pas de la contourner ni de la désactiver.

Déconnexion de l'alimentation• Pour mettre le matériel hors tension sans danger, déconnectez tous les cordons d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.

Protection du cordon d'alimentation • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pincés par des objets.

Réparation-maintenance • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.

Fentes et orifices • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent jamais être bloquées par des objets.

Lithium Batterie • Il a danger d'explosion s'll y a remplacment incorrect de la batterie. Remplacer uniquement avec une batterie du meme type ou d'un ype equivalent recommande par le constructeur. Mettre au reut les batteries usagees conformement aux instructions du fabricant.

Vorsicht

Stromquellen • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden. Dieses Gerät wurde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdanschluß, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.

Stromunterbrechung • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stomversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.

Schutz des Netzkabels • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengestellt werden können.

Wartung • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und/oder andere Gefahren bestehen.

Schlitze und Öffnungen • Wenn das Gerät Schlitze oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Diese Öffnungen dürfen niemals von anderen Objekten blockiert werden.

Litium-Batterie • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

Advertencia

Alimentación eléctrica • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentearia ni eliminaria.

Desconexión de alimentación eléctrica • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.

Protección del cables de alimentación • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.

Reparaciones/mantenimiento • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución, no intentar personalmente la reparación/mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.

Ranuras y aberturas • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalientamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.

Batería de litio • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Desachar las baterías usadas siguiendo las instrucciones del fabricante.

警告

电源 • 该设备只能使用产品上标明的电源。 设备必须使用有地线的供电系统供电。 第三条线（地线）是安全设施，不能不用或跳过 。

拔掉电源 • 为安全地从设备拔掉电源，请拔掉所有设备后或桌面电源的电源线，或任何接到市电系统的电源线。

电源线保护 • 妥善布线， 避免被踩踏，或重物挤压。

维护 • 所有维修必须由认证的维修人员进行。 设备内部没有用户可以更换的零件。为避免出现触电危险不要自己试图打开设备盖子维修该设备。

通风孔 • 有些设备机壳上有通风槽或孔，它们是用来防止机内敏感元件过热。 不要用任何东西挡住通风孔。

锂电池 • 不正确的更换电池会有爆炸的危险。必须使用与厂家推荐的相同或相近型号的电池。按照生产厂的建议处理废弃电池。

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. The Class A limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

NOTE *This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance with FCC emissions limits.*

Table of Contents

Chapter One • Introduction 1-1

About this Manual 1-2

About the Media Presentation Matrix Switcher 1-2

Definitions 1-4

Features 1-5

Video features 1-5

Audio features 1-7

General features 1-8

Chapter Two • Installation 2-1

Mounting the Switcher 2-2

UL guidelines 2-2

Mounting instructions 2-2

Rear Panel Connection and Settings 2-3

Video input and output connections 2-3

Computer video group 2-3

Low resolution video group 2-4

Audio input and output connections 2-4

Audio inputs (both input groups) 2-5

Mic/line audio input group 2-6

Audio outputs 2-6

Serial connections 2-7

Ethernet connection 2-8

Cabling and RJ-45 connector wiring 2-8

Reset button 2-9

Power 2-9

Front Panel Configuration Port 2-10

Chapter Three • Operation 3-1

Front Panel Controls and Indicators 3-2

Input and output buttons 3-3

Input buttons 3-4

Output buttons 3-4

Control buttons 3-5

I/O controls 3-7

Button icons 3-8

Front Panel Operations 3-8

Definitions 3-9

Front panel security lockouts 3-9

Power 3-10

Creating a configuration 3-10

Example 1: Creating a set of computer video and audio ties 3-12

Example 2: Adding a tie to a set of computer video and audio ties 3-14

Example 3: Removing a tie from a set of video and audio ties 3-16

Example 4: Creating a set of low resolution video and audio ties 3-18

Table of Contents, cont'd

Viewing a configuration 3-20
Example 5: Viewing video and audio, audio only, and video only ties 3-20
Setting RGB delay (computer video group only) 3-23
Example 6: Setting the RGB delay for an output 3-24
Selecting S-video or composite video 3-26
Example 7: Selecting the video format for a configurable output 3-26
Using presets 3-28
Example 8: Saving a global ties preset 3-29
Example 9: Recalling a global or partial preset 3-30
Muting and unmuting video and/or audio outputs 3-31
Example 10: Muting and unmuting an output 3-32
Viewing and adjusting the input audio level 3-34
Example 11: Viewing and adjusting an input audio level 3-36
Viewing and adjusting the output volume 3-38
Reading the displayed volume 3-39
Example 12: Viewing and adjusting an output volume level 3-41
Selecting the RS-232 Primary port's baud rate 3-42
Setting the front panel locks ***(Executive*** modes) 3-44
Selecting ***Lock*** mode 2 or toggling between mode 2 and mode 0 3-44
Selecting ***Lock*** mode 2 or toggling between mode 2 and mode 1 3-45
Background illumination 3-45
Performing a system reset from the front panel 3-46

Rear Panel Operations 3-47
Performing soft system resets (resets 3, 4, and 5) 3-48
Performing a hard reset (reset 1) 3-49

Optimizing the Audio 3-49

Troubleshooting 3-50

Configuration Worksheets 3-51
Worksheet example 1: System equipment 3-51
Worksheet example 2: Daily configuration 3-52
Worksheet example 3: Test configuration 3-53
Blank configuration worksheet 3-54

Chapter Four • SIS Programming and Control 4-1

RS-232 Ports 4-2
Rear panel Remote ports 4-3
Front panel Configuration port 4-3

Ethernet (LAN) Port 4-4
Ethernet connection 4-4
Default IP parameters 4-4
Establishing a connection 4-5
Connection timeouts 4-5
Number of connections 4-5
Verbose mode 4-5

Host-to-Switcher Instructions 4-6

Switcher-Initiated Messages 4-6

Switcher Error Responses 4-7

Using the Command/Response Tables 4-7
Symbol definitions for basic SIS commands 4-8
Command/response table for basic SIS commands 4-9
Symbol definitions for IP SIS commands 4-19
Command/response table for IP SIS commands 4-20

Special Characters 4-21

Chapter Five • Switcher Software 5-1

Control Software 5-2
Installing the software 5-2
Software operation via serial port 5-3
Software operation via Ethernet 5-3
Ethernet protocol settings 5-3

DSP Configurator Program 5-4
Starting the program 5-4
Using the program 5-4
Audio signal processor chains and control blocks 5-6
Program audio input signal controls (①) 5-8
Mic/line input signal controls (②) 5-10
Output signal, pre mic mixer, controls (④) 5-12
Output signal, post mic mixer, controls (⑥) 5-13
A/V matrix block (③) 5-14
Mic mixer block (⑤) 5-15
Group masters 5-16
Configuring a group master 5-17
Deleting a group master 5-18
Viewing and using a group master 5-18
Video-only I/O page controls 5-20
Presets 5-21
Save a Preset 5-21
Recall a Preset 5-22

Emulate mode vs. ***Live*** mode 5-23
Synchronizing: pull vs. push 5-23
Selecting ***Live*** mode and pulling data 5-23
DSP Configurator Windows menus 5-26
DSP Configurator File menu 5-26
DSP Configurator Edit menu 5-27
DSP Configurator View menu 5-27
DSP Configurator Tools menu 5-28
DSP Configurator Window menu 5-29
DSP Configurator Help selection 5-29
DSP Configurator Presets dropbox 5-29
DSP Configurator Mode buttons 5-29
DSP capacity and design rule verification 5-30
DSP capacity 5-30
Design rule verification 5-31
Keyboard navigation 5-32
Standard Windows navigation 5-33
DSP Configurator-unique navigation 5-34
Making ties 5-34
Highlighting and marking items, cutting or copying, saving a preset 5-34
Setting group master soft limits 5-36

Optimizing the Audio 5-36
Input clipping and clipping meters 5-36
Setting the input and output gain structure 5-37
Adjusting the pre-matrix 5-37
Finalizing the output gain structure 5-38
Setting the mic input and mic mix-point levels 5-38
Adjusting the post-matrix trim 5-39
Setting the volume control for the amplifier stage 5-39
Calibrating loudness 5-39
Setting loudness using a meter 5-39
Setting loudness "by ear" 5-40

Matrix Switchers Control Program 5-41
Starting the program 5-41
IP Settings/Options window 5-44
Address and Name fields 5-44
Hardware Address field 5-45
Use DHCP checkbox 5-45
Date, Time (local), and GMT (offset) fields 5-45
Sync Time to PC button 5-45
Use Daylight Savings checkbox 5-46
Administrator Password and User Password fields 5-46
Update firmware 5-46
Ethernet-connected firmware upload 5-49
Serial-port-connected firmware upload 5-50
Upload HTML files 5-52
WCP Windows buttons, drop boxes, and trash 5-53

WCP Windows menus 5-53
WCP File menu 5-53
WCP Tools menu 5-54
WCP Audio-input Configuration menu bar selection 5-55
WCP Preferences menu 5-55
WCP Master-Reset menu bar selection 5-57
Using Emulate mode 5-57
Using the help system 5-57

Special Characters 5-57

Button-Label Generator Program 5-57
Using the Button-Label Generator software 5-58

Chapter 6 • HTML Operation 6-1

Download the Startup Page 6-2

Status Tab 6-3
System Status page 6-3
DSVP page 6-4

Configuration Tab 6-5
System Settings page 6-5
IP Settings fields 6-6
Unit Name field 6-6
DHCP radio buttons 6-6
IP Address field 6-6
Gateway IP Address field 6-6
Subnet Mask field 6-6
MAC Address field 6-6
Date/Time Settings fields 6-7
Video Input Settings page 6-8
Passwords page 6-9
Firmware Upgrade page 6-10

File Management Tab 6-14
File Management page 6-14

Control Tab 6-15
Set and View Ties page 6-15
Creating or deleting a tie 6-16
Video and Audio Settings page 6-17
Change the input gain and attenuation 6-17
Mute and unmute one or all outputs 6-18
Change the RGB delay (computer group video outputs only 6-19
Change the output volume level 6-20
Global Presets page 6-22
Save a preset 6-22
Recall a preset 6-23

Special Characters 6-23

Table of Contents, cont'd

Appendix A • Ethernet Connection A-1

Ethernet Link A-2
Ethernet connection A-2
Default address A-2
Pinging to determine Extron IP address A-3
Pinging to determine Web IP address A-3
Connecting as a Telnet client A-4
Telnet tips A-4
Open A-4
Escape character and Esc key A-5
Local echo A-5
Set carriage return-line feed A-5
Close A-5
Help A-5
Quit A-5

Subnetting — A Primer A-6
Gateways A-6
Local and remote devices A-6
IP addresses and octets A-6
Subnet masks and octets A-6
Determining whether devices are on the same subnet A-7

Appendix B • DSP SIS Commnads B-1

Command/Response Table for DSP SIS Commands B-2
Symbol definitions B-3
Command/response table for DSP SIS commands B-9

Appendix C • Reference Information C-1

Specifications C-2

Part Numbers and Accessories C-6
Included parts C-6
Replacement parts C-6
Optional accessories C-6
Cables C-7
Bulk cable and termination tools C-7
Terminated cable assemblies C-7

Button Labels C-9
Installing labels in the matrix switcher's buttons C-9
Button label blanks C-11

All trademarks mentioned in this manual are the properties of their respective owners.

68-1193-01 **B**
05 09

1

Chapter One

Introduction

About this Manual

About the Media Presentation Matrix Switcher

Definitions

Features

Introduction

About this Manual

This manual contains installation, configuration, and operating information for the Extron MPX Plus 866 A Media Presentation Matrix Switcher.

In this manual, the MPX Plus 866 A may be referred to as “the MPX” or “the switcher”.

About the Media Presentation Matrix Switcher

A media presentation switcher combines multiple A/V switchers, of different video formats, in one box.

A matrix switcher distributes any input to any combination of outputs and can route multiple input/output configurations simultaneously.

The MPX Plus 866 A (figure 1-1) combines two video matrix switchers, an audio matrix switcher, a program audio switcher, and a digital signal processor (DSP) that provides a wide variety of microphone pre-amplifier controls, mixers, and filters in a single product.

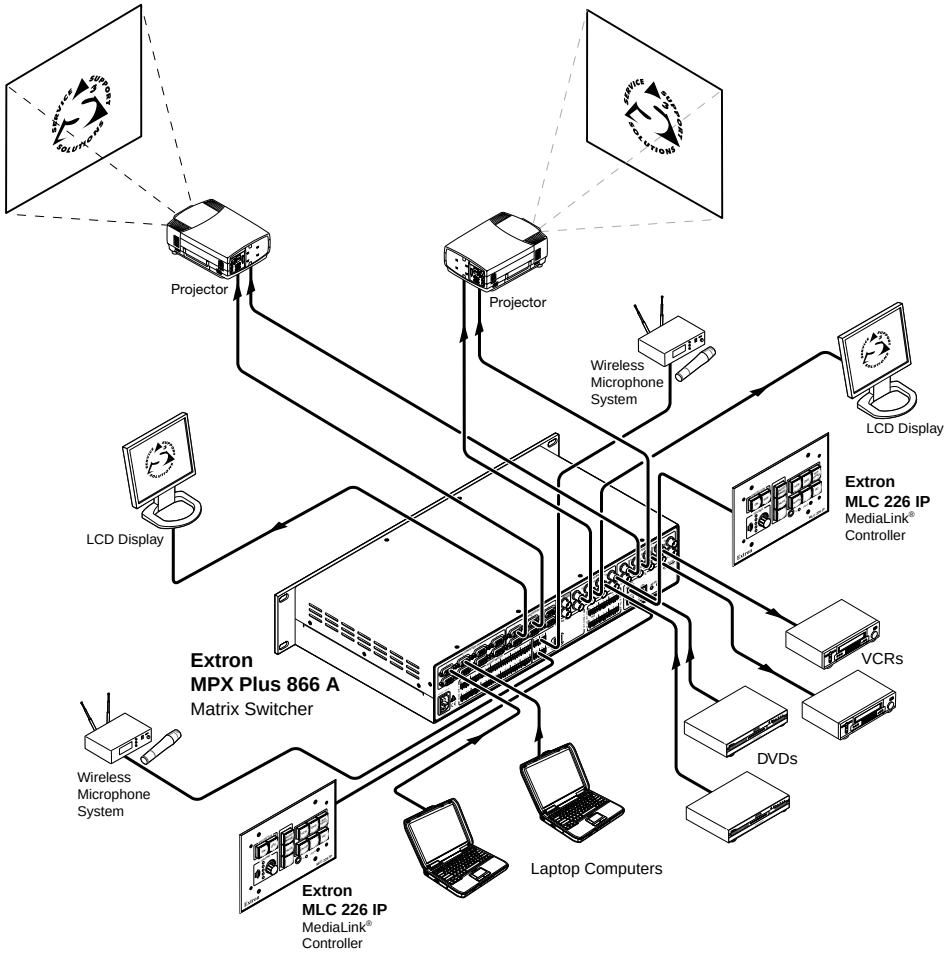


Figure 1-1 — Typical MPX Plus 866 A application

The MPX Plus 866 A has the following switching and mixing capabilities:

- An 8-input by 6-output VGA matrix switcher, comprising the computer video group
- A 6-input by 6-ouput S-video and composite video matrix switcher, comprising the low resolution video group
- A 14-input by 6-output primary audio matrix switcher, comprising the program audio group
- Four mono microphone (mic)/line level inputs that can be mixed with one or all audio outputs of the primary audio group

NOTE *Video ties can only be made within the same group (computer or low resolution).*

Audio ties can be made only to outputs in the computer/audio group (outputs 1 through 6).

The switcher is a solution to complex simultaneous computer video, low resolution video, and audio routing applications. Any input(s) within one of the two groups, computer video and low resolution video, can be switched to any one or all outputs within that same group. Each input and output is individually isolated and buffered; switching is accomplished with virtually no crosstalk or signal noise between channels.

The audio switching can either be linked with the video (audio follow) or independent of the video (audio breakaway). The 14 inputs in the primary audio group can be switched along with inputs from either video group (although audio ties can only be made to the computer/audio group). Adjustable input audio gain and attenuation compensates for level differences among audio inputs.

The mic/line inputs have a talkover feature that automatically reduces the primary audio group when mic/line input is present. When the mic/line input is not present, the primary audio group is restored to the set volume level. The mic talkover threshold is adjustable from 0 dB to -60 dB.

The switcher has two, primary and secondary, rear panel RS-232 ports and a local area network (LAN) Ethernet port for remote control and reporting. The matrix switcher is programmed with Extron's Simple Instruction Set (SIS™), a set of basic ASCII code commands that provide simple control through a control system or PC without programming long, obscure strings of code. SIS commands can be entered via the RS-232 ports or the LAN port.

The LAN port can be connected through a local area network (LAN) or wide area network (WAN).

The MPX can be operated by any of the following connected to either RS-232 port or the LAN port:

- A control system
- A PC and any of the following:
  - The Extron SIS
  - The Extron Windows-based DSP Configurator program
  - The Extron Windows®-based Matrix Switchers Control Program
- An Extron MKP 2000 remote control panel
- An Extron MKP 3000 remote control panel
- (**RS-232 only**) An Extron MCP 1000 remote control panel and/or MKP 1000 remote keypad

The switcher is housed in a rack-mountable, 2U high metal enclosure with mounting flanges for a standard 19" rack. The appropriate rack mounting kit is included with the switcher.

The switcher has an internal 100 VAC to 240 VAC, 50-60 Hz, 48 watts power supply that provides worldwide power compatibility.

Definitions

The following terms, which apply to all Extron matrix switchers, are used throughout this manual:

Tie — An input-to-output video and/or line audio connection.

Set of ties — An input tied to two or more outputs. (An output can never be tied to more than one input.)

Configuration — One or more ties, one or more sets of ties, and/or some or all of the signal processor settings made in the DSP Configurator program.

Current configuration — The configuration that is currently active in the switcher (also called configuration 0)

Partial (DSP-Configurator-created) preset — A partial configuration (a subset of ties and/or sets of ties and/or signal processor settings) that has been stored.

NOTE *Partial presets can be created **only** by using the DSP Configurator program. They can be recalled via any means. When recalled (by any means), partial presets overwrite only a portion of the current configuration, leaving other ties and settings unchanged.*

Global ties preset — A full, ties only, configuration that has been created via the front panel, SIS commands, or the Matrix Switchers Control Program.

NOTE *Up to 32 partial or global ties presets can be stored in memory. Preset locations are assigned to the input buttons and output buttons. Up to 26 preset locations can be selected from the front panel for either saving or retrieving. When a preset is retrieved from memory, it becomes the current configuration (global ties preset) or part of the current configuration (partial preset). Preset numbers larger than 26 are accessible under RS-232 or Ethernet control.*

Features

Video features

Computer video group — The switcher inputs and outputs RGBHV (VGA), RGBS, RGsB, RsGsBs, or Y, R-Y, B-Y video on 15-pin HD connectors.

Low resolution video group — The switcher inputs and outputs NTSC 3.58, NTSC 4.43, PAL, or SECAM S-video and/or composite video.

Input	Video format
9*	Composite only
10	Composite only
11	S-video or composite, as selected
12	S-video or composite, as selected
13	S-video or composite, as selected
14	S-video or composite, as selected

* **Input 9** is a genlock reference. All other low resolution inputs are synced to input 9.

Output	Video format
7	Composite only
8	Composite only
NOTE	*For outputs 7 and 8, if the tied input is S-video, the switcher encodes it to composite. If the tied input is composite video, the switcher passes it through unprocessed.*
9	S-video only
10	S-video only
NOTE	*For outputs 9 and 10, if the tied input is S-video, the switcher passes it through unprocessed. If the tied input is composite video, the switcher decodes it to S-video.*
11	S-video or composite
12	S-video or composite
NOTE	*For outputs 11 and 12, the output is passed through in the same format (S-video or composite) as the tied input.*

Bandwidth —

Computer video group — The switcher provides a minimum of 300 MHz (-3 dB) video bandwidth, fully loaded.

Low resolution video group — The switcher provides a minimum of 150 MHz (-3 dB) video bandwidth, fully loaded.

Digital Sync Validation Processing (DSVP™) (computer video group) — In critical environments or unmanned, remote locations, it may be vital to know that sources are active and switching. Extron's DSVP confirms that input sources are active by scanning all sync inputs for active signals. DSVP provides instantaneous frequency feedback for composite sync or separate horizontal and vertical sync signals via the switcher's RS-232 ports or Ethernet port. The frequency information can be displayed on any control system or in the Windows-based control program on a LAN or Internet Protocol (IP) connection (figure 1-2).

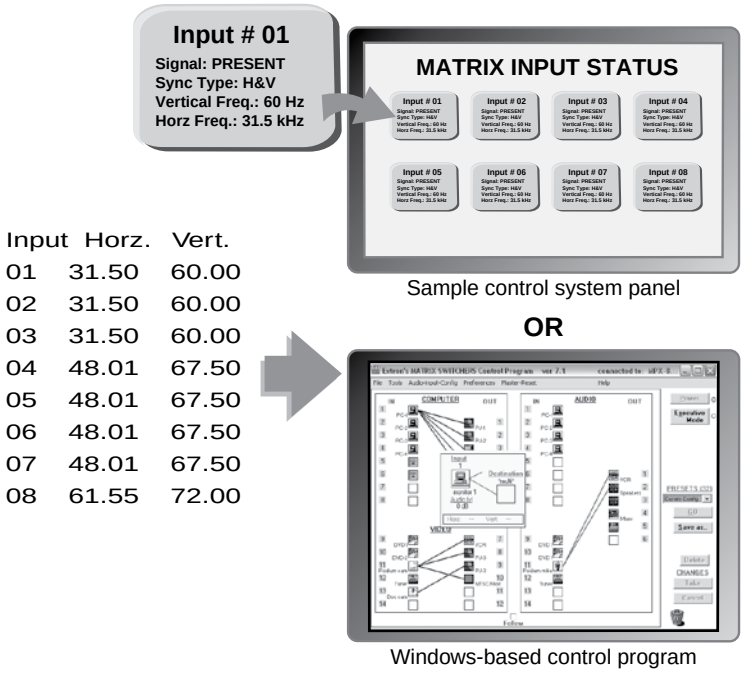


Figure 1-2 — DSVP data display

RGB Delay (computer video group) — The switcher can briefly blank the RGB video output while it switches to the new input's sync source, and then switches the RGB signals. This allows a brief delay for the display to adjust to the selected input's sync timing before displaying the new picture, which will appear without glitches. RGB delay, also known as Triple-Action Switching™ or video mute switching, is user selectable from 0 to 5 seconds, in half-second increments.

Audio features

Primary audio group — Input and output balanced or unbalanced stereo audio on 3.5 mm, 5-pole captive screw terminals.

- **Audio input gain/attenuation (primary audio group) —** Individual input audio levels can be adjusted so there are no noticeable volume differences between sources. Users can set the input level of audio gain or attenuation (-18 dB to +24 dB) via the Ethernet port, any RS-232 port, or the front panel.

Mic audio group — Input mono audio on 3.5 mm, 3-pole captive screw terminals.

- **Audio input gain/attenuation (mic audio group) —** Individual input audio levels can be adjusted so there are no noticeable volume differences between sources. Users can set the input level of audio gain or attenuation (0 dB to +80 dB) using the DSP Configurator program or SIS commands and the Ethernet port or any RS-232 port.
- **Phantom power —** The switcher can provide +48 VDC phantom power, a standardized method of providing power to condenser microphones.
- Output two channel mono audio on the primary audio group outputs.

Audio output volume — The audio volume of each output can be displayed and adjusted through a range of full output to completely silent from the front panel or under RS-232 or Ethernet control.

Digital signal processor — The powerful, built-in, DSP provides a wide variety of high-end audio capabilities, including:

- **Gain, volume, and trimming**
- **Balance control**
- **Filtering**
- **Dynamic processing**
- **Feedback suppression**
- **Delay**
- **Loudness**
- **Mic mixing**
- **Mic ducking**

Group masters — Any of the gain, volume, and trim controls in the DSP can be grouped with other controls of the same type (in the same location in the audio signal flow) for single-slider control of the entire group.

General features

Switching flexibility — Provides individually buffered, independent matrix switched outputs with audio follow and audio breakaway.

NOTE *Program audio inputs are independent of the video groups, but must be tied to the computer/audio group (outputs 1 through 6).*

- **Tie any input to any or all outputs within a video group**
- **Quick multiple tie —** Multiple inputs can be switched to multiple outputs within a video group simultaneously. This allows all displays (outputs) to change from source to source at the same time.
- **Audio follow —** Audio can be switched with its corresponding video input via front panel control or under Ethernet or RS-232 remote control.
- **Audio breakaway —** Audio can be broken away from its corresponding video signal. This feature allows any audio signal to be selected with any video signal simultaneously to one or all outputs in any combination. Audio breakaway switching can be done via front panel control or under Ethernet or RS-232 remote control.

Operational flexibility — Operations such as input/output selection, setting of presets, and adjustment of audio levels can be performed on the front panel or via the Ethernet or RS-232 ports. The Ethernet and RS-232 ports allow remote control via a PC or control system. The Ethernet link allows multiple remote links with two levels of password protection.

- **Front panel control** — The front panel controller supports input and output selection, preset creation and selection, RGB delay (computer video group), and audio gain and attenuation and volume control. The front panel features illuminated pushbuttons that can be labeled with text or graphics.
- **Windows-based control program —** For RS-232 remote control from a PC, the two Extron Windows-based control programs provide graphical interface and drag-and-drop/point-and-click operation. The Windows-based control programs also have emulation modes that let you create switcher configuration files at the home office and then download them for use by the switcher on site.
- **Simple Instruction Set (SIS™) —** The remote control protocol uses Extron's SIS for easy programming and operation.
- **Remote control panels and keypads —** The switcher is remote controllable, using the optional MKP 2000 and MKP 3000 remote control panels. The remote control devices are easy to use and provide tactile buttons for quick selection. Each MKP can be used for input-to-output switching or one-touch switching for a particular output and selecting presets.

Upgradeable firmware — The firmware that controls all switcher operation can be upgraded in the field via RS-232 or Ethernet, without taking the switcher out of service. Firmware upgrades are available for download on the Extron Web site, www.extron.com, and they can be installed using the Windows-based control program.

Labeling — Extron's included label software lets you create labels to place in the front panel I/O buttons, with names, alphanumeric characters, or color bitmaps for easy and intuitive input and output selection. Alternatively, labels can be made with any Brother™ P-Touch™ or comparable labeler.

Global memory presets — 32 global memory presets are a time-saving feature that lets you set up and store input/output configurations in advance. You can then recall those configurations, when needed, with a few simple steps.

Rack mounting — Rack mountable in any conventional 19" wide rack.

Three front panel security lockout modes (*Executive* modes) — If a matrix switcher is installed in an open area, where operation by unauthorized personnel may be a problem, either of two security lockout modes can be implemented (the third mode is unlocked). When a front panel locked mode is enabled, a special button combination or SIS command is required to unlock the front panel controller and make the front panel fully operational.

Power — The matrix switcher's 100 VAC to 240 VAC, internal power supply provides worldwide power compatibility.

Chapter Two

Installation

Mounting the Switcher

Rear Panel Connections and Settings

Front Panel Configuration Port

Installation

Mounting the Switcher

UL guidelines

The following Underwriters Laboratories (UL) guidelines pertain to the installation of the MPX switcher into a rack (figure 2-1).

1. **Elevated operating ambient temperature** — If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consider installing the equipment in an environment compatible with the 104 °F (+40 °C) maximum ambient temperature (Tma) specified by Extron.
2. **Reduced air flow** — Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
3. **Mechanical loading** — Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
4. **Circuit overloading** — Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. **Reliable earthing (grounding)** — Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips.

Mounting instructions

If desired, rack mount the switcher as follows:

1. Insert the switcher into the rack, aligning the holes in the mounting bracket with those in the rack (figure 2-1).
2. Secure the switcher to the rack using the supplied bolts.

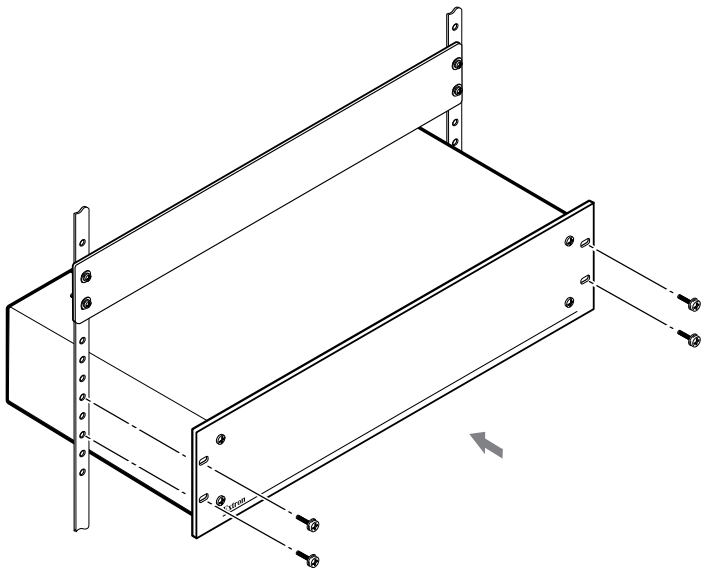


Figure 2-1 — Installing the switcher in a rack

Rear Panel Connection and Settings

All switcher connectors are on the rear panel (figure 2-2).

CAUTION *Use electrostatic discharge precautions (be electrically grounded) when making connections. Electrostatic discharge (ESD) can damage equipment, even if you cannot feel, see, or hear it.*

CAUTION *Remove system power before making all connections.*

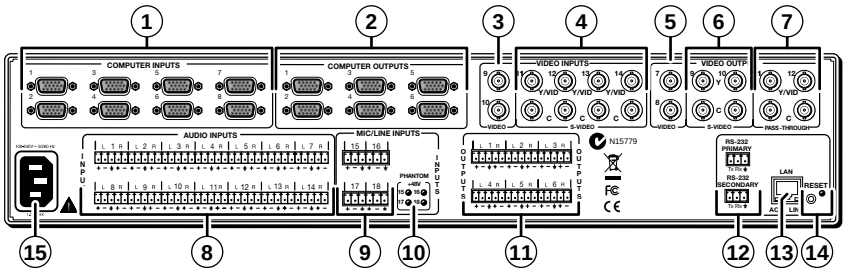


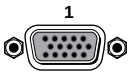
Figure 2-2 — MPX Plus 866 A Media Presentation Matrix Switcher

Video input and output connections

Computer video group

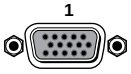
NOTE *The switcher does not alter the computer video inputs in any way. The signal output is in the same format as the input.*

The switcher can connect to up to as many as eight computer video sources and output to as many as six video devices.



① **RGB video inputs —** Connect the analog computer-video sources to the Computer Input 1 through Computer Input 8 female 15-pin HD connectors.

NOTE *Most laptop or notebook computers have an external video port, but they require special commands to output the video to that connector. Also, a laptop's screen shuts off once that port is activated. See the computer's user's guide for details, or visit the Extron Web site, www.extron.com, and search for "laptop commands".*

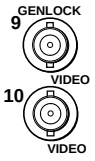


② **RGB video outputs** — Connect RGBHV video displays to the Computer Output 1 through Computer Output 6 female 15-pin HD connectors.

Low resolution video group

The switcher can connect to up to as many as six S-video and/or composite video sources and output to as many as six video devices.

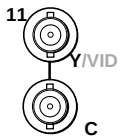
③ **Video Input 9 and Video Input 10 (composite video inputs)** — Connect composite video sources to these female BNC connectors.



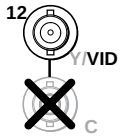
NOTE *Video Input 9 serves as a timing reference for all other low resolution video group inputs. If one of the inputs is synced to a blackburst generator, connect that source to input 9.*

④ **Input 11 through Input 14 —**

S-video inputs — Connect an S-video source to a pair of female BNC connectors. Connect luma (Y) and chroma (C) as shown at right.



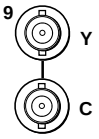
Composite video inputs — Connect a composite video source to the Video (top) connector in a pair of female BNC connectors as shown at right.



⑤ **Composite video outputs (Output 7 and Output 8)** — Connect composite video displays to these female BNC connectors.

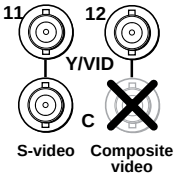
NOTE *If the input tied to Output 7 or Output 8 is S-video, the switcher encodes the input to composite video.*
If the tied input is composite video, the switcher passes it through to the output with no processing.

⑥ **S-video outputs (Output 9 and Output 10)** — Connect S-video displays to these female BNC connectors.



NOTE *If the input tied to Output 9 or Output 10 is composite video, the switcher decodes the input to S-video.*
If the tied input is S-video, the switcher passes it through to the output with no processing.

⑦ **Pass-through outputs (Output 11 and Output 12)** — Connect S-video or composite video displays to these female BNC connectors. Connect S-video Y and C or composite video as shown at right.



NOTE *The switcher passes the tied input to these outputs with no signal processing; an S-video input is output as S-video, a composite video input is output as composite video.*

Audio input and output connections

By default, the audio ties follow the video ties. Audio breakaway, which can be activated via the optional front panel or under Ethernet or RS-232 control, allows you to select from any one of the audio input sources, regardless of video group, and route it separately from its corresponding video source.

NOTE *Audio ties can be made **only** to outputs in the computer/audio group (outputs 1 through 6).*

The audio level for each input and the volume level for each output can be individually set via the front panel or Ethernet or RS-232 control. See chapter 3, "Operation", chapter 4, "SIS Programming and Control", chapter 5, "Switcher Software", and chapter 6, "HTML Operation" for details.

Audio inputs (both input groups)

⑧ **Connections for balanced and unbalanced audio inputs —** Each input has a 5-pole, 3.5 mm captive screw connector for balanced or unbalanced stereo or mono audio input. Connectors are included with the switcher, but you must supply the audio cable.

See figure 2-3 to wire a connector for the appropriate input type. Use the supplied tie-wrap to strap the audio cable to the extended tail of the connector.

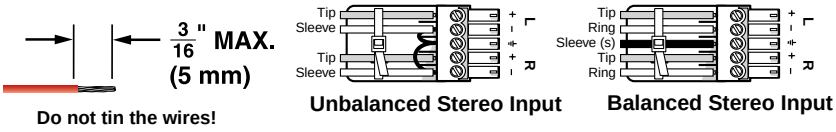


Figure 2-3 — Captive screw connector wiring for stereo audio inputs

CAUTION *The captive screw audio connector can easily be inadvertently plugged partially into one receptacle and partially into an adjacent receptacle. This misconnection could damage the audio circuits. Ensure that the connector is plugged fully and only into the desired input or output.*

NOTE *The length of exposed wires is critical.* ***The ideal length is 3/16" (5 mm).***

- *If the stripped section of wire is longer than 3/16", the exposed wires may touch, causing a short circuit between them.*
- *If the stripped section of wire is shorter than 3/16", wires can be easily pulled out even if tightly fastened by the captive screws.*

See figure 2-4 to identify the tip, ring, and sleeve when you are making connections for the switcher from existing audio cables. A mono audio connector consists of the tip and sleeve. A stereo audio connector consists of the tip, ring and sleeve. The ring, tip, and sleeve wires are also shown on the captive screw audio connector diagrams, figure 2-3, figure 2-5, and figure 2-6.

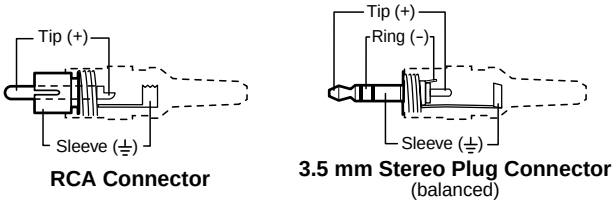


Figure 2-4 — Typical audio connectors

Mic/line audio input group

⑨ **Connections for mono audio inputs —** Each input, numbered 15 through 18, has a 3-pole, 3.5 mm captive screw connector for mono audio input. Connectors are included with the switcher, but you must supply the audio cable.

See figure 2-5 to wire a connector for mono audio input. Use the supplied tie-wrap to strap the audio cable to the extended tail of the connector.

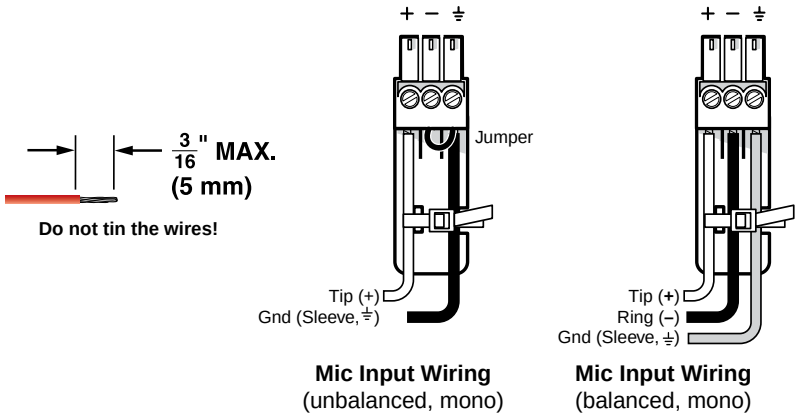


Figure 2-5 — Captive screw connector wiring for mono audio inputs

NOTE *The length of exposed wires is critical.* ***The ideal length is 3/16″ (5 mm).***

- *If the stripped section of wire is longer than 3/16″, the exposed wires may touch, causing a short circuit between them.*
- *If the stripped section of wire is shorter than 3/16″, wires can be easily pulled out even if tightly fastened by the captive screws.*

⑩ **Phantom +48 V LEDs —** These four LEDs, numbered 15 through 18, light to indicate that +48 V phantom power is applied to the associated mic/line inputs.

Audio outputs

⑪ **Connections for balanced and unbalanced audio outputs —** These 5-pole, 3.5 mm captive screw connectors output the selected unamplified, line level audio. Connect audio devices, such as an audio amplifier or powered speakers.

See figure 2-6 to properly wire an output connector. Use the supplied tie-wrap to strap the audio cable to the extended tail of the connector.

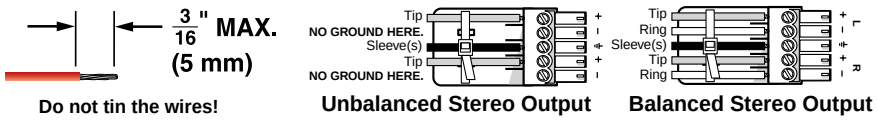


Figure 2-6 — Captive screw connector wiring for stereo audio output

CAUTION *For unbalanced audio, connect the sleeve(s) to the ground contact.* ***DO NOT*** *connect the sleeve(s) to the negative (-) contacts).*

NOTE *The length of exposed wires is critical.* ***The ideal length is 3/16″ (5 mm).***

- *If the stripped section of wire is longer than 3/16″, the exposed wires may touch, causing a short circuit between them.*
- *If the stripped section of wire is shorter than 3/16″, wires can be easily pulled out even if tightly fastened by the captive screws.*

Serial connections

⑫ **RS-232 connectors —** Connect one or two host devices, such as computers, touch panel controls, or RS-232 capable PDAs to the switcher via these 3-pole captive screw connectors for serial RS-232 control (figure 2-7). Use the supplied tie-wrap to strap the serial cable to the extended tail of the connector.

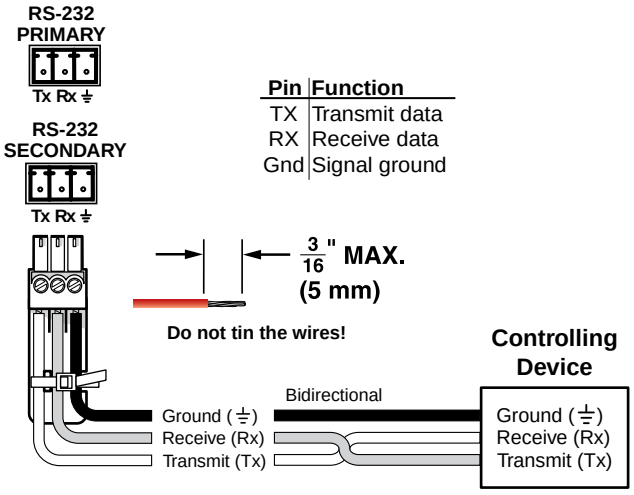


Figure 2-7 — RS-232 connector

NOTE *The length of exposed wires is critical.* ***The ideal length is 3/16" (5 mm).***

- *If the stripped section of wire is longer than 3/16", the exposed wires may touch, causing a short circuit between them.*
- *If the stripped section of wire is shorter than 3/16", wires can be easily pulled out even if tightly fastened by the captive screws.*

NOTE *These two ports are hardwired for RS-232 only.*

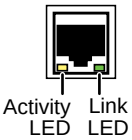
The RS-232 Secondary port is active only if the front panel Configuration port is not in use. If a front panel configuration connection is made, the rear panel RS-232 Secondary port becomes inactive and the front panel Configuration port is active.

NOTE *The switcher can operate at 9600, 19200, 38400, or 115200 baud rates. See "Selecting the RS-232 Primary port's baud rate" in chapter 3, "Operation", to configure the RS-232 Primary port from the front panel. See "Command/Response table for IP SIS commands", in chapter 4, "SIS Programming and Control", to configure all ports under SIS control.*

If desired, connect an MKP 2000 or MKP 3000 remote control panel to the switcher's RS-232 connector. Refer to the *MKP 2000 Remote Control Panel User's Manual* or the *MKP 3000 Remote Control Panel User's Manual* for details.

Ethernet connection

⑬ **LAN port** — If desired, for IP control of the system, connect the matrix switcher to a PC or to an Ethernet LAN via this RJ-45 connector. You can use a PC to control the networked switcher with SIS commands from anywhere in the world. You can also control the switcher from a PC that is either running Extron's Windows-based control program or that has downloaded HTML pages from the switcher.



Ethernet connection indicators — The Link and Act LEDs indicate the status of the Ethernet connection. The Link LED indicates that the switcher is properly connected to an Ethernet LAN. This LED lights steadily. The Act LED indicates transmission of data packets on the RJ-45 connector. This LED flickers as the switcher communicates.

Cabling and RJ-45 connector wiring

It is vital that your Ethernet cables be the correct type cables, and that they be properly terminated with the correct pinout. Ethernet links use Category (CAT) 3, CAT 5e or CAT 6, unshielded twisted pair (UTP) or shielded twisted pair (STP) cables, terminated with RJ-45 connectors. Ethernet cables are limited to a length of 328' (100 m).

NOTE *Do not use standard telephone cables. Telephone cables will not support Ethernet or Fast Ethernet.*

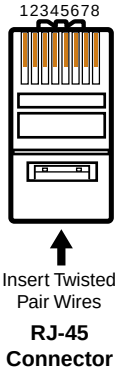
Do not stretch or bend cables. Transmission errors can occur.

The cable used depends on your network speed. The switcher supports both 10 Mbps (10Base-T — Ethernet) and 100 Mbps (100Base-T — Fast Ethernet), half-duplex and full-duplex, Ethernet connections.

- 10Base-T Ethernet requires CAT 3 UTP or STP cable at minimum.
- 100Base-T Fast Ethernet requires CAT 5e UTP or STP cable at minimum.

The Ethernet cable can be terminated as a straight-through cable or a crossover cable and must be properly terminated for your application (figure 2-8).

- **Crossover cable** — Direct connection between the computer and the matrix switcher.
- **Patch (straight) cable** — Connection of the matrix switcher to an Ethernet LAN.



Crossover Cable

Pin	End 1 Wire color	End 2 Wire color
1	White-green	White-orange
2	Green	Orange
3	White-orange	White-green
4	Blue	Blue
5	White-blue	White-blue
6	Orange	Green
7	White-brown	White-brown
8	Brown	Brown
	T568A	T568B

A cable that is wired as T568A at one end and T568B at the other (Tx and Rx pairs reversed) is a "crossover" cable.

Straight-through Cable

Pin	End 1 Wire color	End 2 Wire color
1	White-orange	White-orange
2	Orange	Orange
3	White-green	White-green
4	Blue	Blue
5	White-blue	White-blue
6	Green	Green
7	White-brown	White-brown
8	Brown	Brown
	T568B	T568B

A cable wired the same at both ends is called a "straight-through" cable, because no pin/pair assignments are swapped.

Figure 2-8 — RJ-45 connector and pinout tables

Reset button

⑭ **Reset button and LED** — The Reset button initiates four levels of reset to the matrix switcher. The LED indicates the reset mode activated. Press and hold the button while the switcher is running or while you power up the switcher for different reset levels.

See "Rear panel Operations" in chapter 3, "Operation", for details.

- **Events (mode 3) reset** — Toggles events monitoring on and off.
- **IP settings (mode 4) reset** — Resets the switcher's IP functions.

NOTE *IP settings reset does not replace any user-installed firmware.*

- **Absolute (mode 5) reset** — Restores the switcher to the default factory conditions.
- **Hard (mode 1) reset** — Restores the switcher to the base firmware.

NOTE *Hard reset does not clear the current configuration.*

Power

⑮ **AC power connector —** Plug a standard IEC power cord into this connector to connect the switcher to a 100 VAC to 240 VAC, 50-60 Hz power source.

Front Panel Configuration Port

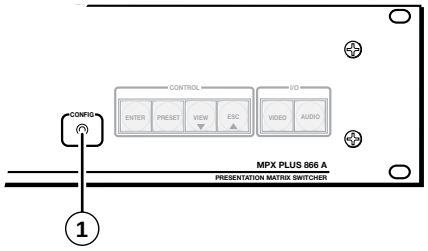
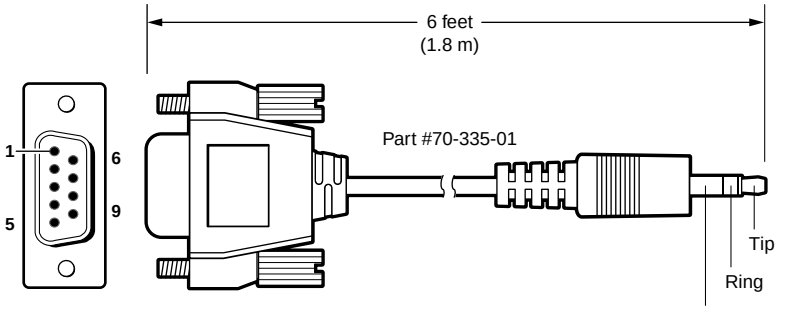


Figure 2-9 — Front panel configuration port

① **Configuration port** — This 2.5 mm mini stereo jack serves the same serial communications function as the rear panel Remote port, but it is easier to access than the rear port after the matrix switcher has been installed and cabled. The optional 9-pin D to 2.5 mm stereo mini TRS RS-232 cable, part **#70-335-01** (figure 2-10) can be used for this connection.



9-pin D	Connection	TRS Plug
Pin 2	Computer's RX line	Tip
Pin 3	Computer's TX line	Ring
Pin 5	Computer's signal ground	Sleeve

Figure 2-10 — Optional 9-pin TRS RS-232 cable

NOTE *This port is completely separate from the rear panel Remote port and is **not** affected by changes to the rear panel port's protocol. This front panel port's protocol can be changed, under SIS command control only.*

This port is RS-232 only, with its default protocols as follows:

- 9600 baud
- no parity
- 8-bit
- 1 stop bit
- no flow control

NOTE *The Configuration port can operate at 9600, 19200, 38400, or 115200 baud rates. See "Command/Response table for IP SIS commands", in chapter 4, "SIS Programming and Control", to configure all ports under SIS control.*

NOTE *The maximum distances from the matrix switcher to the controlling device can vary up to 200 feet (61 m). Factors such as cable gauge, baud rates, environment, and output levels (from the switcher and the controlling device) all affect transmission distance. Distances of about 50 feet (15 m) are typically not a problem. In some cases the matrix switcher may be capable of serial communications via RS-232 up to 250 feet (76 m) away.*

3

Chapter Three

Operation

Front Panel Controls and Indicators

Front Panel Operations

Rear Panel Operations

Optimizing the Audio

Troubleshooting

Configuration Worksheets

Operation

Front Panel Controls and Indicators

The front panel controls (figure 3-1) are grouped into two sets. The input and output buttons are grouped on the left side of the control panel. The control buttons and video/audio (I/O) selection buttons are grouped on the right side of the panel.

The illuminated pushbuttons can be labeled with text and/or graphics. The buttons can be set to provide amber background illumination all the time or the background illumination can be turned off (see "Background illumination", on page 3-45). The buttons blink or are lit at full intensity (depending on the operation) when selected.

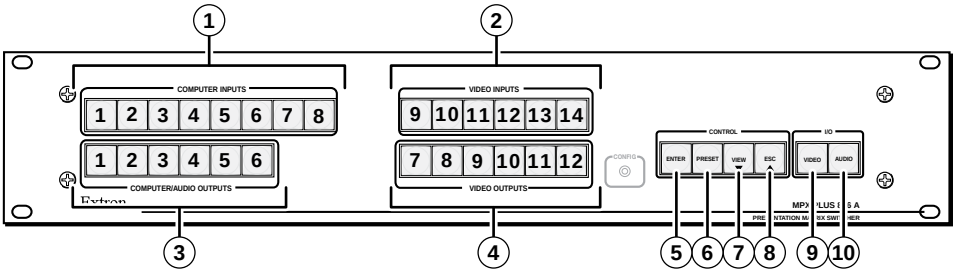


Figure 3-1 — MPX Plus 866 A

1. **Computer Inputs buttons —** See page 3-4.
2. **Video Inputs buttons —** See page 3-4.
3. **Computer/Audio Outputs buttons —** See page 3-4.
4. **Video Output buttons —** See page 3-4.
5. **Enter button —** See page 3-5.
6. **Preset button —** See page 3-6.
7. **View button —** See page 3-6.
8. **Esc button —** See page 3-6.
9. **Video button —** See page 3-7.
10. **Audio button —** See page 3-7.

Input and output buttons

Primary functions								
	Action:	Select input or output for tie being created.						
	Indications:	*Blinking*: potential tie/untie *Lit*: current tie *Amber*: video and audio tie *Green*: video only tie *Red*: audio only tie						
		1	**2**	**3**	through	**7**	**8**	**14**
Secondary functions								
Presets	**Action/ indication:**	Select a preset in *Preset* mode. *Lit*: A preset has already been saved to this location. *Blinking*: Preset location is selected to be saved.						
RGB Delay	**Indication:**	*Output 1 through 10*: Indicate the RGB delay.						
Input configuration	**Action/ indication: *(outputs)***					Select/ indicate composite video	Select/ indicate S-video	
Input audio level	**Action/ indication: *(inputs)***	*Inputs*: Select the input's audio for gain or attenuation adjustment. *Lit*: Input's audio is selected for adjustment.						
	Indication: *(outputs)*	Indicate the input gain or attenuation level.						
Output audio volume	**Action/ indication: *(outputs)***	*Outputs*: Select the output's audio for volume adjustment. *Lit*: Output's audio is selected for adjustment.						
	Indication: *(inputs)*	*Inputs 1 through 12*: Indicate the output volume level.						
Mutes	**Action/ indication:**	*Outputs*: Press and hold to mute the video and audio, video, or audio output. *Outputs blink*: Output is muted.						
Background illumination	**Action:**	Press and hold to toggle between background illumination or buttons unlit.						

Input buttons

① **Computer video inputs 1 through 8 —** Select and identify computer video group inputs.

② **Low resolution video inputs 9 through 14 —** Select and identify low resolution video group inputs.

The input buttons have one primary function (•) and four secondary (❑) functions:

- Select and identify an input.

NOTE
- *Computer inputs 1 through 8 video can be tied* **only** *to outputs 1 through 6.*
- *Video inputs 9 through 14 video can be tied* **only** *to outputs 7 through 12.*
- *Audio can be tied only to outputs 1 through 6. If you make a video and audio tie from the low resolution video group (inputs 9 through 14), audio is tied to an output in the computer group (outputs 1 through 6).*
- *"Input selection" includes selecting Video inputs 11 through 14 for video configuration (S-video or composite).*

❑ Select a preset. See "Using presets" on page 3-28.

❑ Display the RGB delay. See "Setting RGB delay (computer video group only)" on page 3-23.

NOTE *Although the low resolution video input buttons display part of the RGB delay value, the delay itself is applied only to ties within the computer video group.*

❑ Display the output volume level. See "Viewing and adjusting the output volume" on page 3-38.

❑ **(Input 1 and Input 2)** Toggle background illumination of the buttons on and off. See "Background illumination" on page 3-45.

Output buttons

③ **Computer/Audio outputs 1 through 6 —** Select and identify computer video group outputs.

④ **Low resolution video outputs 7 through 12 —** Select and identify low resolution video group outputs.

The output buttons have one primary function (•) and four secondary (❑) functions:

- Select and identify one or more output(s).

NOTE
- *Computer outputs 1 through 6 can accept a video tie only from inputs 1 through 8.*
- *Video outputs 7 through 12 video can accept a video tie only from inputs 9 through 14.*

❑ Select a preset. See "Using presets" on page 3-28.

❑ Mute the output. See "Muting and unmuting video and/or audio outputs" on page 3-31.

❑ **(Output 7 and Output 8)** select S-video or composite video for inputs 11 through 14. See "Selecting S-video composite or video" on page 3-26.

❑ Display the audio level of the selected input. See "Viewing and adjusting the input audio level" on page 3-34.

Control buttons

Primary functions					
	Action:	Save changes	Select *Preset* mode	Select *View* mode	Cancel/escape
	Indication:	*Blinking*: save needed	*Blinking*: Save preset *Lit*: Recall preset	*View* mode selected	Flashes once
Secondary functions					
Port configuration	**Action 1:**	Select *Configuration* mode			
	Action 2/ indication:	Select 9600 baud. *Blinking*: selected	Select 19200 baud. *Blinking*: selected	Select 38400 baud. *Blinking*: selected	Select 115200 baud. *Blinking*: selected
Front panel locks	**Action:**	With Video and Audio buttons, select *Lock* mode 2 and/or toggle between mode 0 and mode 2.			
RGB delay	**Action:**			**Computer video output group:**	
				In *Video* mode, decrease the switching interval.	In *Video* mode, increase the switching interval.
Audio	**Action:**			In *Audio* mode, decrease input level or output volume.	In *Audio* mode, increase input level or output volume.

⑤ **Enter button —** The Enter button has one primary function (•) and three secondary (❑) functions:

- Save configuration or preset changes that you make on the front panel and indicate that a potential change has been created but not saved. To create a simple configuration:
  - ❍ Specify video, audio, or both (see I/O selection buttons [⑨] and [⑩])
  - ❍ Press the desired input button (① or ②)
  - ❍ Press the desired output button(s) (③ or ④)
  - ❍ Press the Enter button.

NOTE

- *Video outputs in the computer video group (③) can be tied* **only** *to a computer video input (①).*
- *Video outputs in the low resolution video group (④) can be tied* **only** *to a low resolution video input (②).*
- *Audio can be tied only to outputs 1 through 6. If you make a video and audio tie from the low resolution video group (inputs 9 through 14), audio is automatically tied to an output in the computer group (outputs 1 through 6).*

❑ With the Preset, View, and Esc buttons, select *Serial Port Selection and Configuration* mode. See "Selecting the RS-232 Primary port's baud rate" on page 3-42.

❑ Select 9600 baud for the rear panel RS-232 port in *Serial Port Selection and Configuration* mode and indicate the selection. See "Selecting the RS-232 Primary port's baud rate" on page 3-42.

❑ With the Video and Audio buttons, select front panel security *Lock* mode 2 or toggle between mode 0 (unlocked) and mode 2. See "Setting the front panel locks (*Executive* modes)" on page 3-44.

⑥ **Preset button —** The Preset button has two primary functions (•) and two secondary (❑) functions:

- Activates *Save Preset* mode to save a configuration as a preset and blinks to indicate the selection.
- Activates *Recall Preset* mode to activate a previously-defined preset and lights steadily to indicate the selections.

❑ With the Enter, View, and Esc buttons, select *Serial Port Selection and Configuration* mode. See "Selecting the RS-232 Primary port's baud rate" on page 3-42.

❑ Select 19200 baud for the RS-232 Primary port in *Serial Port Selection and Configuration* mode and indicate the selection. See "Selecting the RS-232 Primary port's baud rate" on page 3-42.

⑦ **View (▼) button —** The View (▼) button has one primary function (•) and five secondary (❑) functions:

- Select *View-Only* mode, which displays the current configuration and indicates the selection.

NOTE *View-only mode also provides a way to mute and unmute the outputs. See "Muting and unmuting video and/or audio outputs" on page 3-31.*

❑ Decrease the RGB delay of switches to the selected output. See "Setting RGB delay (computer video group only)" on page 3-23.

❑ Decrease the audio level of the selected input. See "Viewing and adjusting the input audio level" on page 3-34.

❑ Decrease the volume of the selected output. See "Viewing and adjusting the output volume" on page 3-38.

❑ With the Enter, Preset, and Esc buttons, select *Serial Port Configuration* mode. See "Selecting the RS-232 Primary port's baud rate" on page 3-42.

❑ Select 38400 baud for the RS-232 Primary port in *Serial Port Selection and Configuration* mode, and indicate the selection See "Selecting the RS-232 Primary port's baud rate" on page 3-42.

⑧ **Esc (▲) button —** The Esc (▲) button has one primary function (•) and five secondary (❑) functions:

- Cancel operations or selections in progress and reset the front panel indicators and flashes once to indicate that the function has been activated.

NOTE *The Esc (▲) button does **not** reset the current configuration, the Video selection button and Audio selection button, any presets, or any audio gain or attenuation or volume settings.*

❑ Increase the RGB delay of switches to the selected output. See "Setting RGB delay (computer video group only)" on page 3-23.

❑ Increase the audio level of the selected input. See "Viewing and adjusting the input audio level" on page 3-34.

❑ Increase the volume of the selected output. See "Viewing and adjusting the output volume" on page 3-38.

❑ With the Enter, Preset, and View buttons, select *Serial Port Configuration* mode. See "Selecting the RS-232 Primary port's baud rate" on page 3-42.

❑ Select 115200 baud for the RS-232 Primary port in *Serial Port Selection and Configuration* mode, and indicate the selection See "Selecting the RS-232 Primary port's baud rate" on page 3-42.

I/O controls

Primary functions			
	Action/ indication:	Select video. Green when selected	Select audio. Red when selected
		VIDEO	AUDIO
Secondary functions			
Front panel locks	**Action 1:**	With Enter, select *Lock* mode 2 and/or toggle between mode 0 and mode 2.	
	Action 2:	Select *Lock* mode 1 and/or toggle between mode 2 and mode 1.	
RGB delay/ Input 11 - 14 format	**Action/ indication:**	Select *Video* mode. Blinks green.	
Resets	**Action:**	Perform a system reset	
Audio	**Action/ indication:**		Select *Audio* mode. Blinks red.

⑨ **Video button —** The Video button has one primary function (•) and four secondary (❑) functions:

- • Selects and deselects video for a configuration that is being created or viewed and lights to indicate the selection.
- ❑ With the Enter button and Audio button, selects between front panel locks (*Lock* mode 2 and *Lock* mode 0). See "Setting the front panel locks (*Executive* modes)" on page 3-44.
- ❑ With the Audio button, selects between front panel locks (*Lock* mode 2 and *Lock* mode 1). See "Setting the front panel locks (*Executive* modes)" on page 3-44.
- ❑ With the Audio button, commands the front panel system reset. See "Performing a system reset from the front panel" on page 3-46.
- ❑ Selects the *Video* mode, in which you can set the RGB delay and select the input formats for inputs 11 through 14. See "Setting RGB delay (computer video group only)" on page 3-23.

⑩ **Audio button —** The Audio button has one primary function (•) and four secondary (❑) functions

- • Selects and deselects audio for a configuration that is being created or viewed and lights to indicate the selection.
- ❑ Selects the *Audio* mode, in which you can adjust the input audio level and the output audio volume. See "Viewing and adjusting the input audio level" on page 3-34 and "Viewing and adjusting the local output volume" on page 3-38.
- ❑ With the Enter button and RGBHV/Video button, selects between front panel locks (*Lock* mode 2 and *Lock* mode 0). See "Setting the front panel locks (*Executive* modes)" on page 3-44.
- ❑ With the RGBHV/Video button, selects between front panel locks (*Lock* mode 2 and *Lock* mode 1). See "Setting the front panel locks (*Executive* modes)" on page 3-44.
- ❑ With the Video button, commands the front panel system reset. See "Performing a system reset from the front panel" on page 3-46.

Button icons

The numbered translucent covers on the input and output pushbuttons can be removed and replaced to insert labels behind the covers.

Input and output labels can be created easily with Extron's Button-Label Generator software, which ships with every Extron matrix switcher. Each input and output can be labeled with names, alphanumeric characters, or even color bitmaps for easy and intuitive input and output selection (figure 3-2). See chapter 5, "Switcher Software", for details on using the labeling software. See appendix C, "Reference Information", for blank labels and a procedure for removing and replacing the translucent covers.

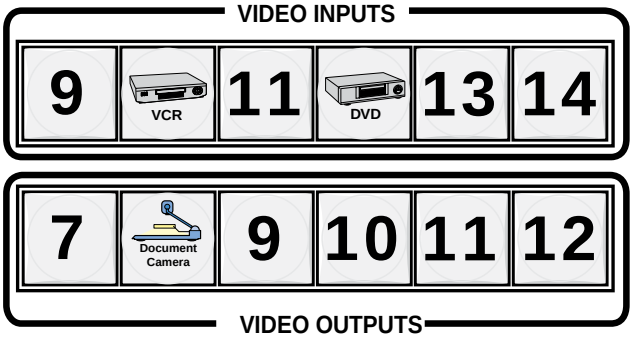


Figure 3-2 — Sample button icons

Front Panel Operations

The following paragraphs detail the power-up process and then provide sample procedures for the following actions:

- Creating ties, sets of ties, and configurations
- Changing a configuration
- Viewing ties, sets of ties, and configurations
- Setting RGB delay for ties to outputs 1 through 6
- Selecting the composite or S-video formats for inputs 11 through 14
- Saving a preset
- Recalling a preset
- Muting and unmuting outputs
- Viewing and adjusting the input audio level
- Viewing and adjusting the output volume
- Reading and setting the RS-232 Primary port settings
- Locking the front panel
- Setting background illumination
- Performing front panel resets

Definitions

The following terms, which apply to Extron matrix switchers, are used throughout this manual:

Tie — An input-to-output video and/or line audio connection.

Set of ties — An input tied to two or more outputs. (An output can never be tied to more than one input.)

Configuration — One or more ties, one or more sets of ties, and/or some or all of the signal processor settings made in the DSP Configurator program.

Current configuration — The configuration that is currently active in the switcher (also called configuration 0)

Partial (DSP-Configurator-created) preset — A partial configuration (a subset of ties and/or sets of ties and/or signal processor settings) that has been stored.

NOTE *Partial presets can be created **only** by using the DSP Configurator program. They can be recalled via any means. When recalled (by any means), partial presets overwrite only a portion of the current configuration, leaving other ties and settings unchanged.*

Global ties preset — A full, ties only, configuration that has been created via the front panel, SIS commands, or the Matrix Switchers Control Program.

NOTE *Up to 32 partial or global ties presets can be stored in memory. Preset locations are assigned to the input buttons and output buttons. Up to 26 preset locations can be selected from the front panel for either saving or retrieving. When a preset is retrieved from memory, it becomes the current configuration (global ties preset) or part of the current configuration (partial preset). Preset numbers larger than 26 are accessible under RS-232 or Ethernet control.*

Front panel security lockouts

In the procedural descriptions that follow, it is assumed that the switcher is in *Lock* mode 0 (fully unlocked). The following two *Lock* modes are also available:

- *Lock* mode 1 — All changes are locked from the front panel (except for setting *Lock* mode 2). Some functions can be viewed.
- *Lock* mode 2 — Advanced features are locked and can be viewed only. Basic functions, such as tie creation, are unlocked.

NOTE *The switcher is shipped from the factory in* Lock *mode 2.*

See "Setting the front panel locks (*Executive* modes)" on page 3-44 for a detailed list of basic and advanced functions and the procedure to set the various front panel locks.

Power

Apply power by connecting a power cord between an AC source and the rear panel power connector. The switcher performs a self-test that flashes the front panel button indicators green, red, and amber and then turns them off. An error-free power up self-test sequence leaves all input, output, and control buttons either unlit or showing background illumination and the Video button and the Audio button lit.

The current configuration and all presets are saved in non-volatile memory. When power is applied, the most recent configuration is retrieved. The previous presets remain intact.

If an error occurs during the self-test, the switcher locks up and does not operate. If your switcher locks up on power-up, call the Extron S^3 Sales & Technical Support Hotline. See the rear cover of this manual for the phone number in your region of the world.

Creating a configuration

The current configuration can be changed using the front panel buttons. Change the current configuration as follows:

1. Press the Esc button to clear any input button indicators, output button indicators, or control button indicators that may be lit.
2. Select to configure video, audio, or both by pressing the Video button and/or Audio button.
3. Select the desired input and output(s) by pressing the input and output buttons.

   The input button lights. The output buttons light or blink as follows:

   - **Amber** to indicate **video and audio** ties
   - **Green** to indicate **video only** ties
   - **Red** to indicate **audio only** ties.

   To indicate **tentative ties**, output buttons **blink** the appropriate color when an input is selected.

   To indicate **current ties**, output buttons **light steadily** the appropriate color when an input is selected.

   To clear unwanted outputs, press and release the associated lit output buttons. To indicate **tentative unties**, output buttons **blink** the appropriate color when an output is deselected but not untied from the input.
4. Press and release the Enter button to accept the tie.
5. Repeat steps **1** through **4** to create additional ties until the desired configuration is complete.

NOTE

- *Video ties cannot be made between the computer video group and the low resolution video group (figure 3-3).*

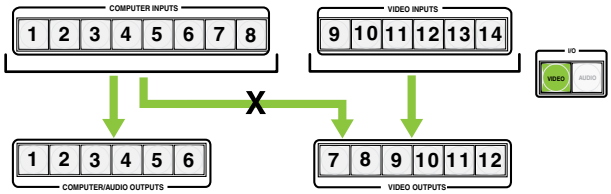


Figure 3-3 — Video ties

- *Audio ties can only be made to the computer video/audio group (outputs 1 through 6) (figure 3-4).*

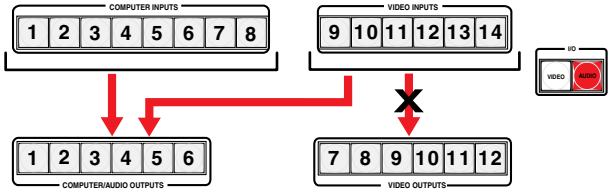


Figure 3-4 — Audio ties

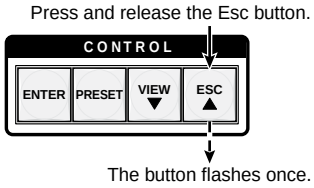
- *Video and audio ties between the low resolution video input group and the low resolution video output group are **always** made with the audio redirected. In such an operation, the switcher automatically ties the audio to an output in the computer video/audio outputs group (outputs 1 through 6) as follows:*
  - *If the video is tied to output 7, the audio is tied to output 1.*
  - *If the video is tied to output 8, the audio is tied to output 2.*
  - *If the video is tied to output 9, the audio is tied to output 3.*
  - *If the video is tied to output 10, the audio is tied to output 4.*
  - *If the video is tied to output 11, the audio is tied to output 5.*
  - *If the video is tied to output 12, the audio is tied to output 6.*
- *If video is selected for configuration (the Video LED is lit) and you press the input button for an input in one group and then try to select an output in the other group, the associated output button cannot be selected. The associated input LED remains lit.*
- *Audio from the mic group **cannot** be selected from the front panel. Audio in this group can be selected **only** under serial port or Ethernet control.*
- *Only one video input and one audio input can be tied to an output.*
- *If a tie is made between an input and an output, and the selected output was previously tied to another input, the older tie is broken in favor of the newer tie.*
- *If an input with no tie is selected, only that input's button lights.*
- *When the Video button and Audio button are lit, if an input with an audio tie but no video tie is selected, the output button lights the appropriate color (amber, green, or red).*
- *As each input and output is selected, the associated output button blinks the appropriate color to indicate a tentative tie. Buttons for output(s) that were already tied to the input light the appropriate color steadily. Outputs that are already tied can be left on, along with new blinking selections, or toggled off by pressing the associated output button.*

Example 1: Creating a set of computer video and audio ties

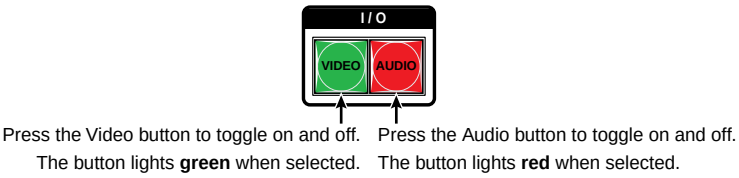
In the following example, input 5 is tied to outputs 3, 4, and 6. The steps show the front panel indications that result from your action.

NOTE *This example assumes that there are no ties in the current configuration.*

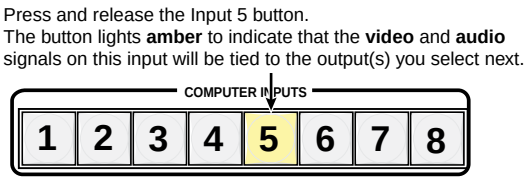
1. **Clear all selections**: Press and release the Esc button.



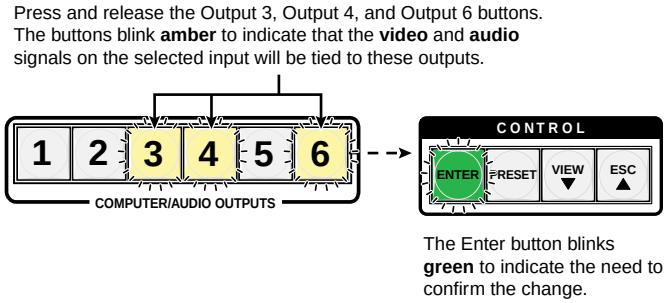
2. **Select video and audio for the tie**: If necessary, press and release the Video button and the Audio button until the buttons light.


I/O
VIDEO
AUDIO
Press the Video button to toggle on and off.
The button lights **green** when selected.
Press the Audio button to toggle on and off.
The button lights **red** when selected.

3. **Select an input**: Press and release the input 5 button.

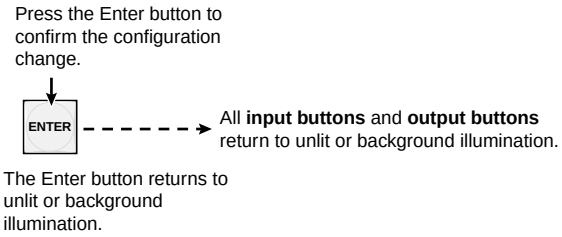


4. **Select the outputs**: Press and release the output 3, output 4, and output 6 buttons.


Press and release the Output 3, Output 4, and Output 6 buttons.
The buttons blink **amber** to indicate that the **video** and **audio** signals on the selected input will be tied to these outputs.
1
2
3
4
5
6
COMPUTER/AUDIO OUTPUTS
CONTROL
ENTER
PRESET
VIEW
ESC
The Enter button blinks **green** to indicate the need to confirm the change.

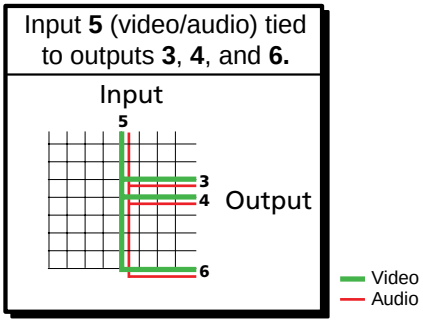
NOTE *The entire set of potential ties can be canceled at this point by pressing and releasing the Esc button. The Esc button flashes green once.*

5. **Confirm the change**: Press and release the Enter button.


Press the Enter button to confirm the configuration change.
ENTER
All **input buttons** and **output buttons** return to unlit or background illumination.
The Enter button returns to unlit or background illumination.

The current configuration is now:

- Input 5 video and audio tied to output 3, output 4, and output 6

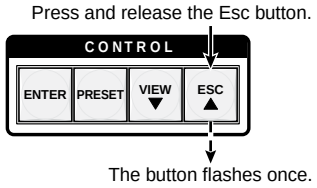


Example 2: Adding a tie to a set of computer video and audio ties

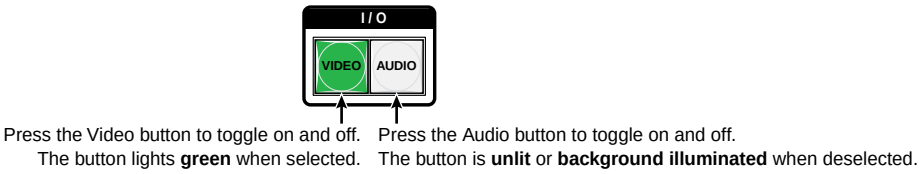
In the following example, a new video tie is added to the current configuration. The steps show the front panel indications that result from your action.

NOTE *This example assumes that you have performed example 1.*

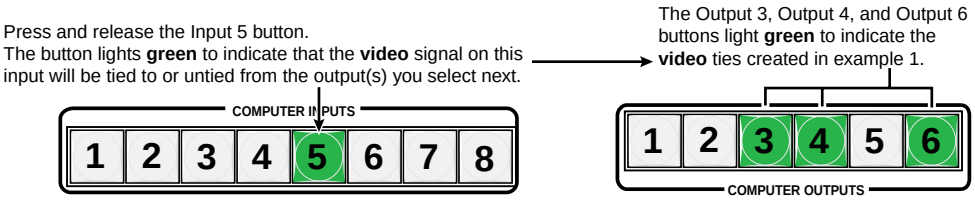
1. **Clear all selections**: Press and release the Esc button.



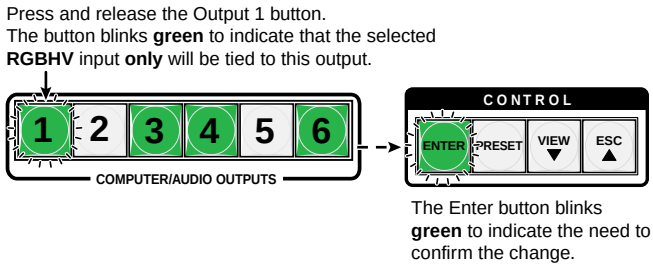
2. **Select video only for the tie**: If necessary, press and release the Video button and the Audio button.


I/O
VIDEO
AUDIO
Press the Video button to toggle on and off. The button lights green when selected.
Press the Audio button to toggle on and off. The button is unlit or background illuminated when deselected.

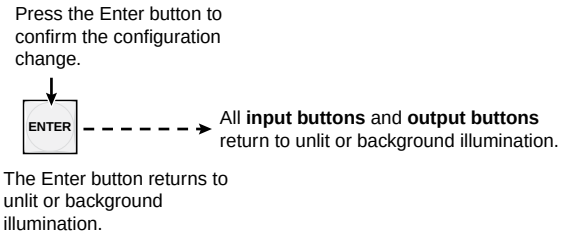
3. **Select an input**: Press and release the input 5 button.


Press and release the Input 5 button.
The button lights green to indicate that the video signal on this input will be tied to or untied from the output(s) you select next.
COMPUTER INPUTS
1 2 3 4 5 6 7 8
The Output 3, Output 4, and Output 6 buttons light green to indicate the video ties created in example 1.
1 2 3 4 5 6
COMPUTER OUTPUTS

4. **Select the output**: Press and release the output 1 button.

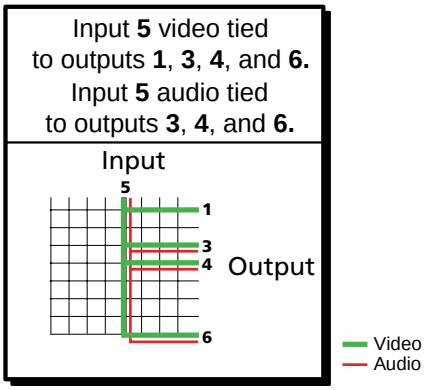

Press and release the Output 1 button.
The button blinks green to indicate that the selected RGBHV input only will be tied to this output.
1 2 3 4 5 6
COMPUTER/AUDIO OUTPUTS
CONTROL
ENTER
PRESET
VIEW
ESC
The Enter button blinks green to indicate the need to confirm the change.

5. **Confirm the change**: Press and release the Enter button.


Press the Enter button to confirm the configuration change.
ENTER
All **input buttons** and **output buttons** return to unlit or background illumination.
The Enter button returns to unlit or background illumination.

The current configuration is now:

- **Video —** Input 5 video tied to output 1, output 3, output 4, and output 6
- **Audio —** Input 5 audio tied to output 3, output 4, and output 6

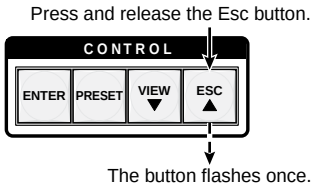


Example 3: Removing a tie from a set of video and audio ties

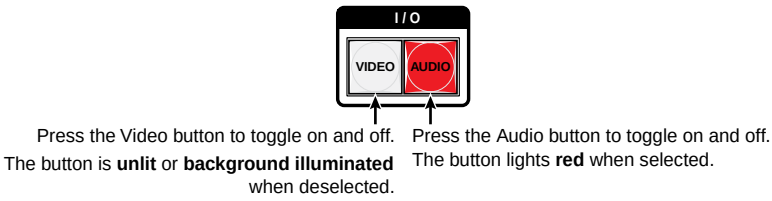
In the following example, an existing audio tie is removed from the current configuration. The steps show the front panel indications that result from your action.

NOTE *This example assumes that you have performed example 1 and example 2.*

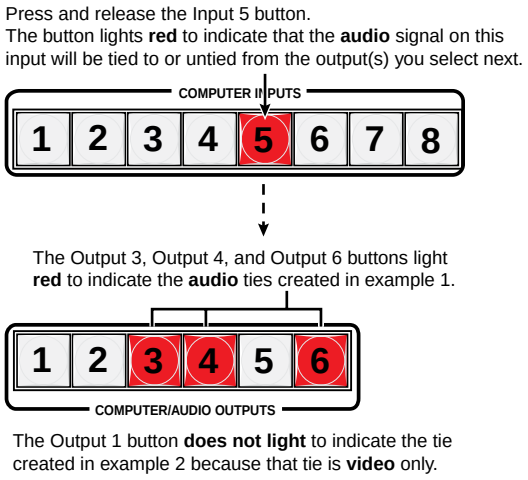
1. **Clear all selections**: Press and release the Esc button.



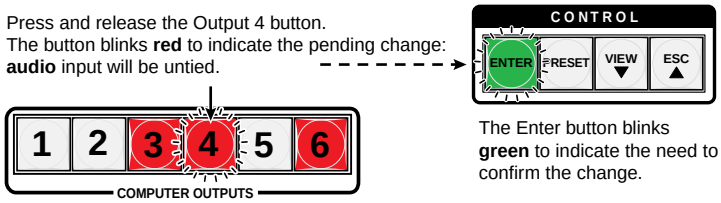
2. **Select audio only for the tie**: If necessary, press and release the Video button and the Audio button.


I/O
VIDEO
AUDIO
Press the Video button to toggle on and off.
The button is unlit or background illuminated when deselected.
Press the Audio button to toggle on and off.
The button lights red when selected.

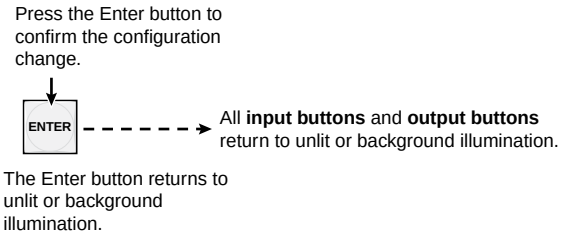
3. **Select an input**: Press and release the input 5 button.


Press and release the Input 5 button.
The button lights red to indicate that the audio signal on this input will be tied to or untied from the output(s) you select next.
COMPUTER INPUTS
1 2 3 4 5 6 7 8
The Output 3, Output 4, and Output 6 buttons light red to indicate the audio ties created in example 1.
1 2 3 4 5 6
COMPUTER/AUDIO OUTPUTS
The Output 1 button does not light to indicate the tie created in example 2 because that tie is video only.

4. **Select the output**: Press and release the output 4 button.

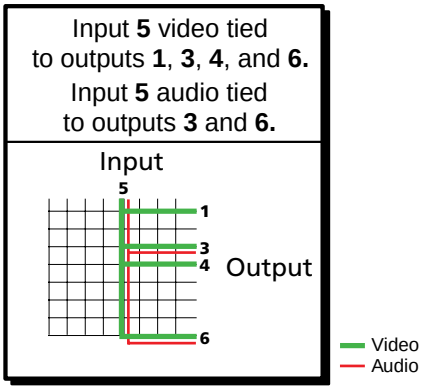

Press and release the Output 4 button.
The button blinks red to indicate the pending change: audio input will be untied.
CONTROL
ENTER
PRESET
VIEW
ESC
The Enter button blinks green to indicate the need to confirm the change.
1 2 3 4 5 6
COMPUTER OUTPUTS

5. **Confirm the change**: Press and release the Enter button.


Press the Enter button to confirm the configuration change.
ENTER
All **input buttons** and **output buttons** return to unlit or background illumination.
The Enter button returns to unlit or background illumination.

The current configuration is now:

- **Video —** Input 5 video tied to output 1, output 3, output 4, and output 6
- **Audio — (audio models)** Input 5 audio tied to output 3 and output 6



Example 4: Creating a set of low resolution video and audio ties

NOTE *This example shows the unusual indications that occur when you make video and audio ties in the low resolution video group.*

In the following example, low resolution input 12 is tied to outputs 7 and 8. The steps show the front panel indications that result from your action.

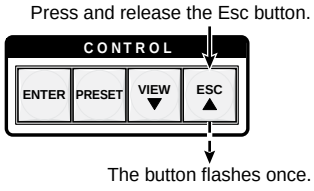
NOTE *This example does **not** build on examples 1, 2, and 3. It assumes that there are no ties in the current configuration.*

NOTE *When creating video **and** audio ties in the low resolution video group, audio must be redirected (tied to a different, but corresponding, output than the video) because there are only audio outputs 1 through 6. In this case, the audio is tied to an output in the computer video/audio group.*

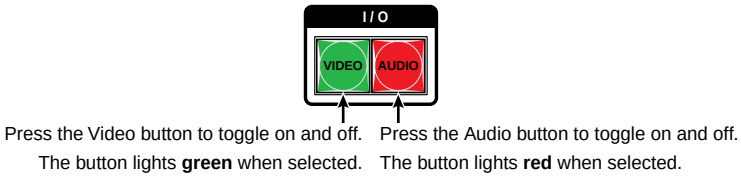
- *If the video is tied to output 7, the audio is tied to output 1.*
- *If the video is tied to output 8, the audio is tied to output 2.*
- *If the video is tied to output 9, the audio is tied to output 3.*
- *If the video is tied to output 10, the audio is tied to output 4.*
- *If the video is tied to output 11, the audio is tied to output 5.*
- *If the video is tied to output 12, the audio is tied to output 6.*

NOTE *If you select an input in the low resolution video input group (inputs 9 through 14), you can select outputs only in the low resolution video output group (outputs 7 through 12). The switcher automatically redirects the audio. This restriction applies to tying and untying,*

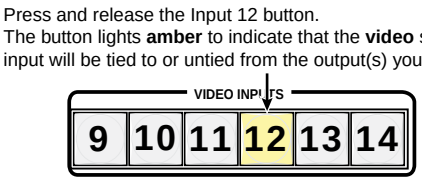
1. **Clear all selections**: Press and release the Esc button.



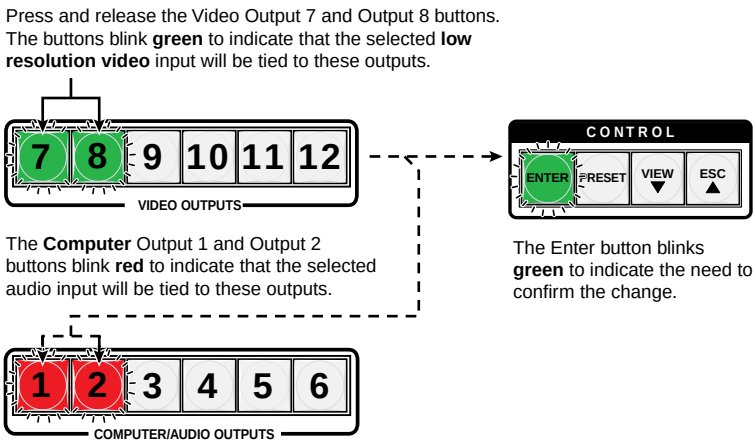
2. **Select video and audio for the tie**: If necessary, press and release the Video button and the Audio button until the LEDs light.


I/O
VIDEO
AUDIO
Press the Video button to toggle on and off.
The button lights green when selected.
Press the Audio button to toggle on and off.
The button lights red when selected.

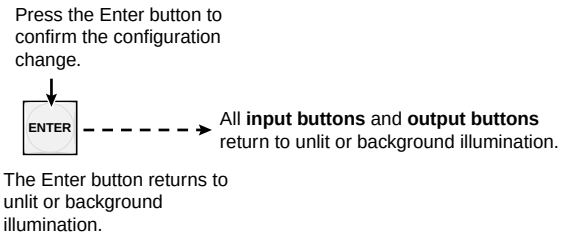
3. **Select an input**: Press and release the low resolution Input 12 button.


Press and release the Input 12 button.
The button lights amber to indicate that the video signal on this input will be tied to or untied from the output(s) you select next.
VIDEO INPUTS
9
10
11
12
13
14

4. **Select the outputs**: Press and release the low resolution Output 7 and Output 8 buttons.

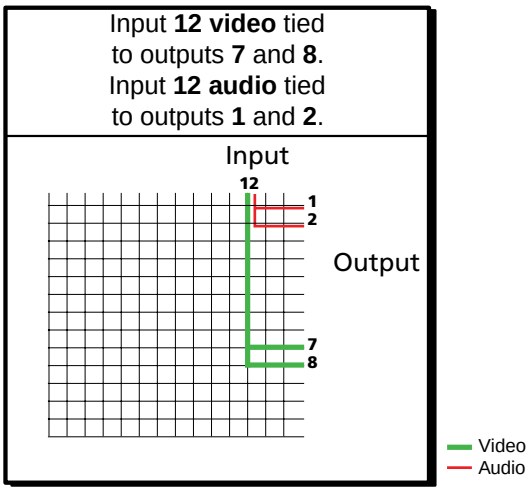

Press and release the Video Output 7 and Output 8 buttons. The buttons blink **green** to indicate that the selected **low resolution video** input will be tied to these outputs.
7
8
9
10
11
12
VIDEO OUTPUTS
CONTROL
ENTER
RESET
VIEW
ESC
The **Computer** Output 1 and Output 2 buttons blink **red** to indicate that the selected audio input will be tied to these outputs.
The Enter button blinks **green** to indicate the need to confirm the change.
1
2
3
4
5
6
COMPUTER/AUDIO OUTPUTS

5. **Confirm the change**: Press and release the Enter button.


Press the Enter button to confirm the configuration change.
ENTER
All **input buttons** and **output buttons** return to unlit or background illumination.
The Enter button returns to unlit or background illumination.

The current configuration is now:

- **Video —** Input 12 video tied to output 7 and output 8
- **Audio —** Input 12 audio tied to output 1 and output 2



Viewing a configuration

The current configuration can be viewed using the front panel buttons. The *View-Only* mode prevents inadvertent changes to the current configuration. *View-Only* mode also provides a way to mute video and audio outputs (see "Muting and unmuting video and/or audio outputs" on page 3-31.

View the current configuration as follows:

1. Press the Esc button to clear any input button indications, output button indications, or control button indications that may be on.
2. Press and release the View button. All of the buttons for outputs that are **not** tied light:
   - **Amber**: No tied video **or** audio input
   - **Green**: No tied video input
   - **Red**: No tied audio input
3. Select video, audio, or both to view by pressing the Video button and/or the Audio button.
4. Select the desired input or output(s) whose ties you wish to view by pressing the input and output buttons.

NOTE

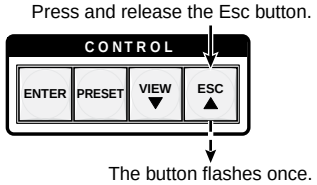
- *When you enter View-Only mode, the output buttons light for all outputs without ties. Likewise, when an output button for which there are no ties is pushed, the output buttons turn on for all outputs without ties.*
- *To see all ties of the current configuration, press and release each input and output button, one at a time, with the Video button and the Audio button lit.*
- *In View-Only mode, you can view video and audio, video-only, or audio-only ties. Pressing and releasing the Video button and the Audio button toggles each on and off.*
- *When you view video and audio ties, the Video button is lit green and the Audio button is lit red. After you select an input or output, the output buttons light different colors to show where video and audio ties are not the same (audio is broken away) as follows:*
  - *Amber = video and audio*
  - *Green = video only*
  - *Red = audio only*

Example 5: Viewing video and audio, audio only, and video only ties

The following example shows the viewing of the video and audio, audio-only, and video-only ties in the current configuration. The steps show the front panel indications that result from your action.

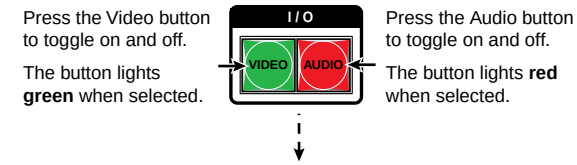
NOTE *This example assumes that you have performed example 1, example 2, and example 3.*

1. **Clear all selections**: Press and release the Esc button.

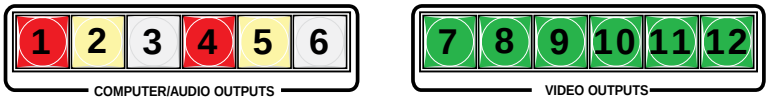


2. **Select *View-only* mode**: Press and release the View button. The View button lights red.

3. **Select video and audio for viewing**: If necessary, press and release the Video button and the Audio button.

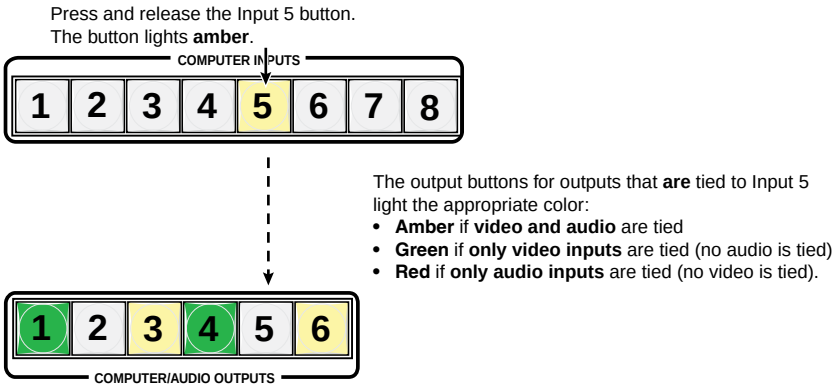

Press the Video button to toggle on and off.
The button lights **green** when selected.
I / O
VIDEO
AUDIO
Press the Audio button to toggle on and off.
The button lights **red** when selected.

Until you select an input, the buttons for all untied outputs light the appropriate color:
- **Amber** if **no inputs** are tied
- **Green** if **no video inputs** are tied (only audio is tied)
- **Red** if **no audio inputs** are tied (only video is tied).



NOTE *Video Outputs buttons can only light **green** when no input is tied because audio cannot be tied to the low resolution video outputs.*

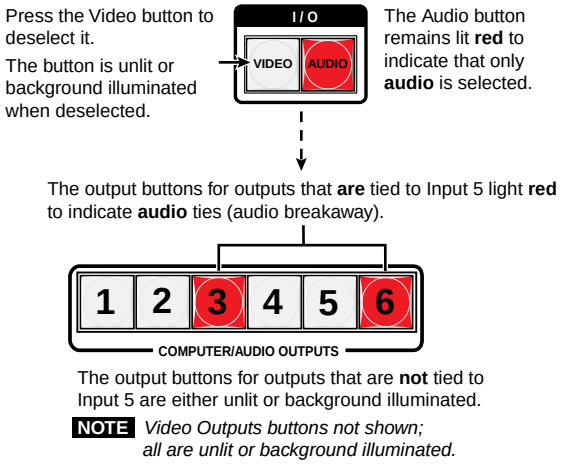
4. **Select an input**: Press and release the input 5 button.


Press and release the Input 5 button.
The button lights **amber**.
COMPUTER INPUTS
1 2 3 4 5 6 7 8
The output buttons for outputs that **are** tied to Input 5 light the appropriate color:
- **Amber** if **video and audio** are tied
- **Green** if **only video inputs** are tied (no audio is tied)
- **Red** if **only audio inputs** are tied (no video is tied).
1 2 3 4 5 6
COMPUTER/AUDIO OUTPUTS
The output buttons for outputs that are **not** tied to Input 5 are either unlit or background illuminated.

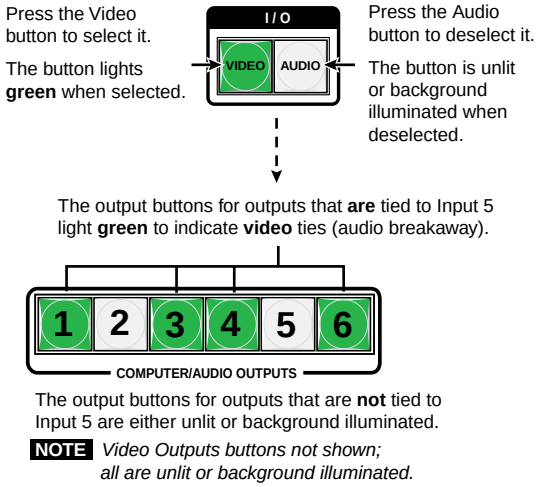
NOTE *Video Outputs buttons not shown; all are unlit or background illuminated.*

NOTE *A set of ties can also be viewed by selecting a tied output. To demonstrate this, note the number of a lit output button, and then press and release the output button for an untied (unlit or background illumination) output. Observe that all of the untied outputs light. Then press the output button that you noted previously and observe that the selected output button, the tied input button (input 5), and the output buttons light for all of the outputs that are tied to the input.*

5. **Deselect video (select audio only)**: Press and release the Video button.

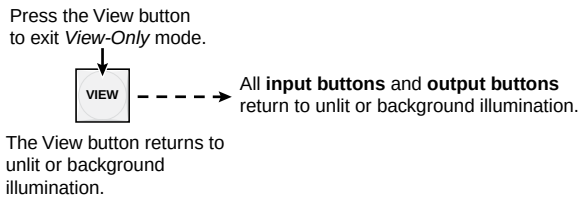

Press the Video button to deselect it.
The button is unlit or background illuminated when deselected.
I / O
VIDEO
AUDIO
The Audio button remains lit **red** to indicate that only **audio** is selected.
The output buttons for outputs that **are** tied to Input 5 light **red** to indicate **audio** ties (audio breakaway).
1 2 3 4 5 6
COMPUTER/AUDIO OUTPUTS
The output buttons for outputs that are **not** tied to Input 5 are either unlit or background illuminated.
NOTE *Video Outputs buttons not shown; all are unlit or background illuminated.*

6. **Deselect audio (select video only)**: Press and release the Video button and the Audio button.


Press the Video button to select it.
The button lights **green** when selected.
I / O
VIDEO
AUDIO
Press the Audio button to deselect it.
The button is unlit or background illuminated when deselected.
The output buttons for outputs that **are** tied to Input 5 light **green** to indicate **video** ties (audio breakaway).
1 2 3 4 5 6
COMPUTER/AUDIO OUTPUTS
The output buttons for outputs that are **not** tied to Input 5 are either unlit or background illuminated.
NOTE *Video Outputs buttons not shown; all are unlit or background illuminated.*

If video ties are established for input 5, the output buttons for all video outputs tied to input 5 light green. If no ties are established for input 5, all output buttons return to either unlit or to background illumination.

7. **Exit *View-only* mode**: Press and release the View button.


Press the View button to exit *View-Only* mode.
VIEW
All **input buttons** and **output buttons** return to unlit or background illumination.
The View button returns to unlit or background illumination.

Setting RGB delay (computer video group only)

The switcher can briefly blank the red, green, and blue planes of a Computer Video output while a tie is made to it. This allows a brief delay for the display to adjust to the tied input's sync timing before displaying the new picture, which will appear without glitches. RGB delay, also known as Triple-Action Switching™ or video mute switching, is user selectable from 0 to 5 seconds, in half-second increments.

The RGB delay interval can be set on the front panel or by using the RS-232 and Ethernet ports and either the SIS, Windows control program, or HTML pages (see chapter 4, "SIS Programming and Control", chapter 5, "Switcher Software", and chapter 6, "HTML operation". Specify the RGB delay interval for a specific output on the front panel as follows:

NOTE *RGB delay is protected when front panel* lock *mode 2 is selected. You can view the delay in* lock *mode 2, but not change it from the front panel. See "Setting the front panel Locks (*Executive *modes)" on page 3-44.*

1. Press the Esc button to clear any input buttons, output buttons, or control buttons that may be lit.
2. To enter *Video* mode, press and **hold** the Video button until the button begins to blink green, then release the button.
3. Press and release an output button to select an output. Each lit input button, from Input 1 through Input 10, indicates a half second of RGB delay interval for the selected output.
4. Press and release the Esc (▲) and View (▼) buttons to increase and decrease the interval.
5. Press and release the Video button to exit the *Video* mode. The Video button stops blinking.

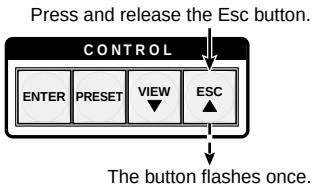
NOTE

- *Video Inputs buttons 9 and 10 display part of the RGB delay value, but the delay is not applied to low resolution video ties.*
- *Pressing the Enter or Preset button also exits* Video *mode. Pressing the Preset button changes to Recall Preset mode.*
- *The RGB delay period for each output is stored in non-volatile memory. When power is removed and restored, the delay settings are retained.*
- *Exiting* Video *mode by pressing the Video button always returns the I/O configuration to video and audio selected for configuration (Video button and Audio button both lit).*

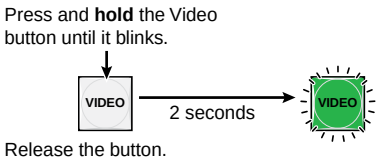
Example 6: Setting the RGB delay for an output

In the following example, the RGB delay is increased for ties to output 1. The steps show the front panel indications that result from your action.

1. **Clear all selections**: Press and release the Esc button.

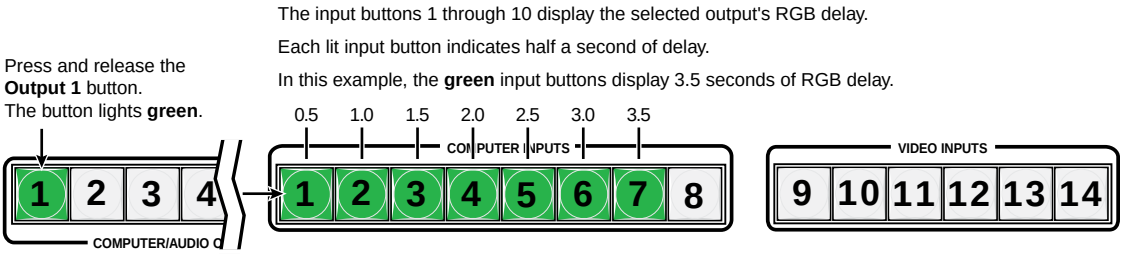


2. **Select *Video* mode**: Press and **hold** the Video button for approximately 2 seconds.



3. **Select an input**: Press and release the output 1 button.

NOTE *An output from the low resolution video group cannot be selected.*



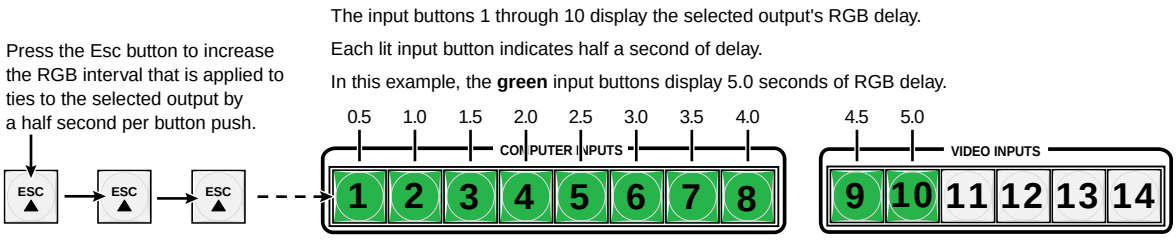
NOTE *The RGB delay is protected when front panel* lock *mode 2 is selected. You can view the delay in* lock *mode 2, but not change it from the front panel. See "Setting the front panel Locks (*Executive *modes)" on page 3-44.*

If front panel lock *mode 2 is selected and you try to perform steps* **4**, *the actions are ignored and the Enter, Video, and Audio buttons flash.*

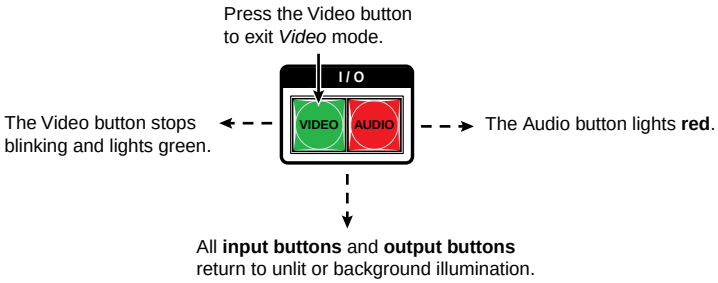
4. **Change the RGB delay**: Press and release the Esc (▲) button once to increase the RGB delay by a half second.

   Press and release the Esc (▲) button twice more to increase the RGB delay by a whole second. Note the input button indication changes that occur each time the Esc (▲) button is pressed and released.

   The figure below show the result of pressing the Esc (▲) button a total of 3 times.


Press the Esc button to increase the RGB interval that is applied to ties to the selected output by a half second per button push.
ESC
ESC
ESC
The input buttons 1 through 10 display the selected output's RGB delay.
Each lit input button indicates half a second of delay.
In this example, the green input buttons display 5.0 seconds of RGB delay.
0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0
COMPUTER INPUTS
1 2 3 4 5 6 7 8
4.5 5.0
VIDEO INPUTS
9 10 11 12 13 14

5. **Deselect *Video* mode**: Press and release the Video button.


Press the Video button to exit Video mode.
I / O
VIDEO
AUDIO
The Video button stops blinking and lights green.
The Audio button lights red.
All input buttons and output buttons return to unlit or background illumination.

Selecting S-video or composite video

Low resolution video inputs 11 through 14 are individually configurable as either composite video or S-video. View and change this variable from the front panel as follows:

NOTE *The input video format is protected when front panel* Lock *mode 2 is selected. You can view the selected form of the input in* Lock *mode 2 but you cannot change it from the front panel. See "Setting the front panel Locks (*Executive *modes)" on page 3-44.*

1. Press the Esc button to clear any input buttons, output buttons, or control buttons that may be lit.
2. To enter *Video* mode, press and **hold** the Video button until the button begins to blink green, then release the button.
3. Press and release one of Video Input buttons 11 through 14 to select that input. Either Video Output button 7 or 8 lights to indicate the video format. Video Output 7 indicates composite video and Video Output 8 indicates S-video.
4. Press and release the Video Output 7 or 8 button to select the associated video format.
5. Press and release the Video button to exit the *Video* mode. The Video button stops blinking.

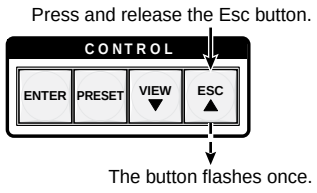
NOTE

- *Pressing the Enter or Preset button also exits* Video *mode. Pressing the Preset button changes to Recall Preset mode.*
- *For the switcher to recognize the change and create a new configuration map, you must create a new tie for the input whose format was changed.*
- *Exiting* Video *mode by pressing the Video button always returns the I/O configuration to video and audio selected for configuration.*

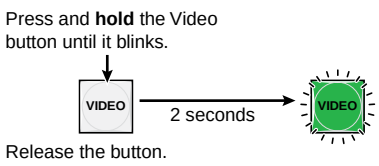
Example 7: Selecting the video format for a configurable output

In the following example, the S-video format is selected for video input 13. The steps show the front panel indications that result from your action.

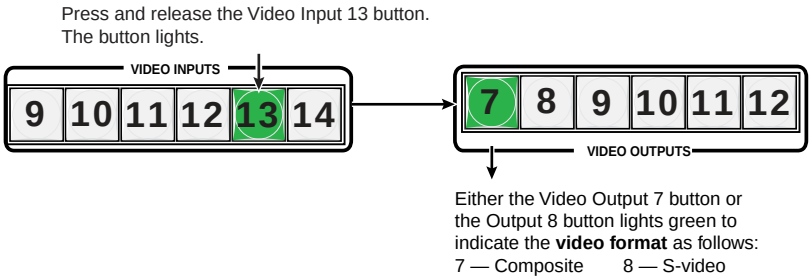
1. **Clear all selections**: Press and release the Esc button.



2. **Select *Video* mode**: Press and **hold** the Video button.



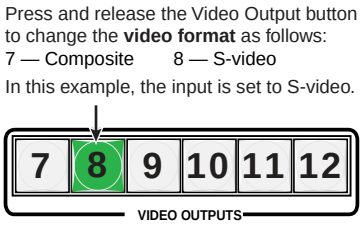
3. **Select a configurable input**: Press the Video Input button for one of inputs 11 through 14.


Press and release the Video Input 13 button.
The button lights.
VIDEO INPUTS
9 10 11 12 13 14
7 8 9 10 11 12
VIDEO OUTPUTS
Either the Video Output 7 button or the Output 8 button lights green to indicate the **video format** as follows:
7 — Composite 8 — S-video

NOTE *The input video format is protected when front panel* Lock *mode 2 is selected. You can view the selected formats in* Lock *mode 2 but you cannot change them from the front panel. See "Setting the front panel Locks (*Executive *modes)" on page 3-44.*

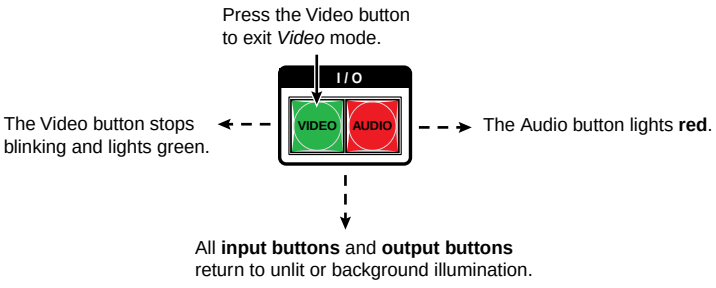
If front panel Lock *mode 2 is selected and you try to perform step 4, the action is ignored.*

4. **Change the format**: Press and release the unlit Video Output button, 7 or 8, that relates to the desired format.


Press and release the Video Output button to change the **video format** as follows:
7 — Composite 8 — S-video
In this example, the input is set to S-video.
7 8 9 10 11 12
VIDEO OUTPUTS

NOTE *If desired, select another of configurable video inputs 11 through 14 to view or change the video format for that input.*

5. **Deselect *Video* mode**: Press and release the Video button.


Press the Video button to exit *Video* mode.
I / O
VIDEO AUDIO
The Video button stops blinking and lights green.
The Audio button lights **red**.
All **input buttons** and **output buttons** return to unlit or background illumination.

NOTE *For the switcher to recognize the change and create a new configuration map, you must create a new tie for the input whose format was changed.*

Using presets

The current configuration (configuration 0) can be saved as a preset in any one of 32 preset memory addresses. Up to 26 of those presets can be selected from the front panel to be either saved or retrieved. Global preset locations 1 through 14 are assigned to the input buttons. Global presets 15 through 26 are assigned to the output buttons. Global presets 27 through 32 are available via the RS-232 and Ethernet links only.

Figure 3-5 shows the presets associated with the input and output button configuration of the MPX Plus 866 A.

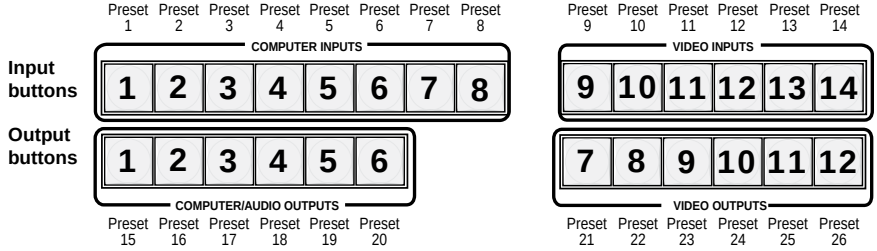


Figure 3-5 — Preset locations

When a preset is retrieved from memory, it becomes the current configuration if it is a global ties preset or part of the current configuration if a partial preset.

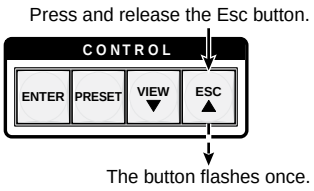
NOTE

- *When presets are **saved** from the front panel, only the audio and video ties are stored.*
  - *Audio gain and volume settings are not saved as a global ties preset.*
  - *The video format (composite or S-video) for outputs 11 through 14 are not saved as a global ties preset.*
- *Saving global ties presets is protected when front panel* lock *mode 2 is selected. See "Setting the front panel Locks (Executive modes)" on page 3-44.*
- *When presets are **recalled** from the front panel, any signal processing adjustments that were saved as part of the preset (under DSP Configurator control only) are recalled and overwrite the current audio settings.*
- *Presets **cannot** be viewed from the front panel unless recalled as the current configuration. Presets **can** be viewed using Extron's Windows-based DSP Configurator program or Matrix Switchers Control Program. See chapter 5, "Switcher Software", for more details.*
- *The current configuration and all presets are stored in non-volatile memory. When power is removed and restored, the current configuration is still active and all presets are retained.*
- *When a global ties preset is recalled, it replaces the current configuration, which is lost unless it is also stored as a preset. The recalled preset overwrites all of the current configuration ties in favor of the preset configuration ties.*
- *When a partial preset is recalled, it overwrites that portion of the current configuration addressed by the preset, leaving the rest unchanged.*

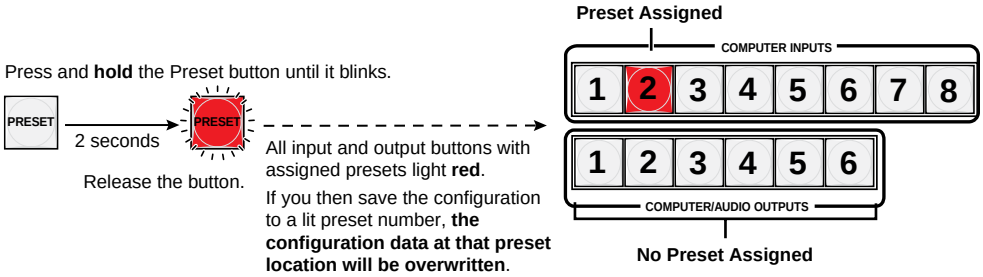
Example 8: Saving a global ties preset

In the following example, the current configuration is saved as a global ties preset. The steps show the front panel indications that result from your actions.

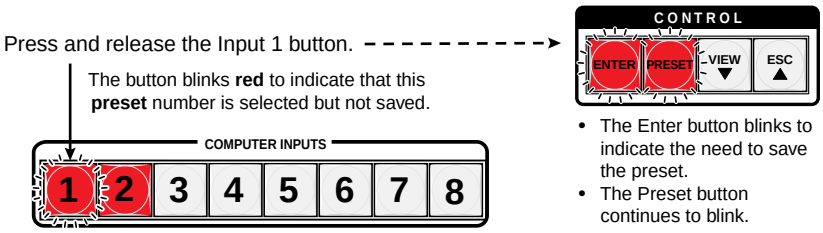
1. **Clear all selections**: Press and release the Esc button.



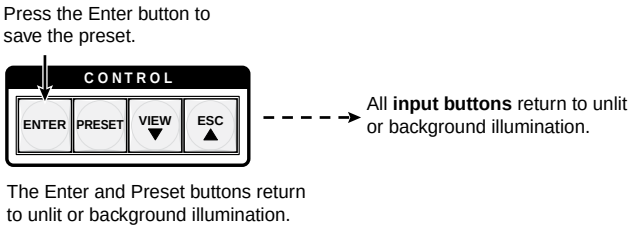
2. **Select *Save Preset* mode**: Press and **hold** the Preset button for approximately 2 seconds until it blinks.


Press and **hold** the Preset button until it blinks.
PRESET
2 seconds
PRESET
Release the button.
All input and output buttons with assigned presets light **red**.
If you then save the configuration to a lit preset number, **the configuration data at that preset location will be overwritten**.
Preset Assigned
COMPUTER INPUTS
1 2 3 4 5 6 7 8
1 2 3 4 5 6
COMPUTER/AUDIO OUTPUTS
No Preset Assigned

3. **Select the preset number**: Press and release the input or output button for the desired preset.


Press and release the Input 1 button.
The button blinks **red** to indicate that this **preset** number is selected but not saved.
COMPUTER INPUTS
1 2 3 4 5 6 7 8
CONTROL
ENTER
PRESET
VIEW
ESC
• The Enter button blinks to indicate the need to save the preset.
• The Preset button continues to blink.

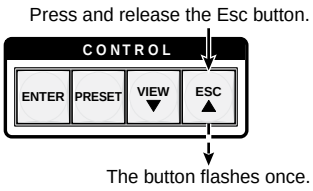
4. **Confirm the preset save**: Press and release the Enter button. The current configuration is now stored in the selected memory location.


Press the Enter button to save the preset.
CONTROL
ENTER
PRESET
VIEW
ESC
All **input buttons** return to unlit or background illumination.
The Enter and Preset buttons return to unlit or background illumination.

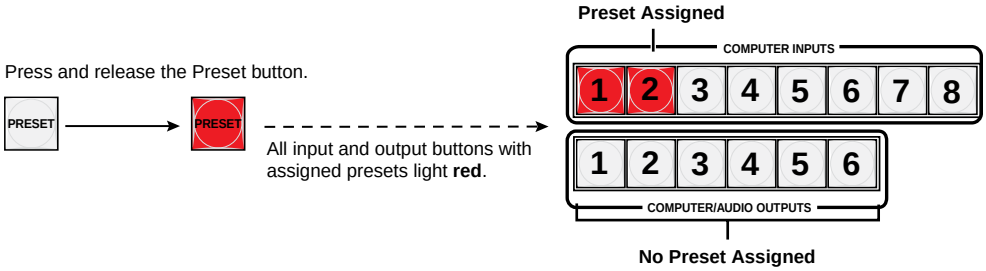
Example 9: Recalling a global or partial preset

In the following example, a preset is recalled to become the current configuration. The steps show the front panel indications that result from your actions.

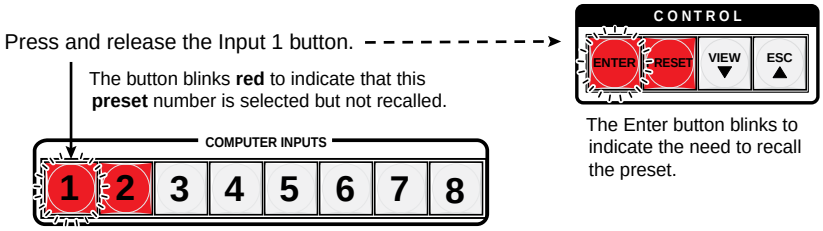
1. **Clear all selections**: Press and release the Esc button.



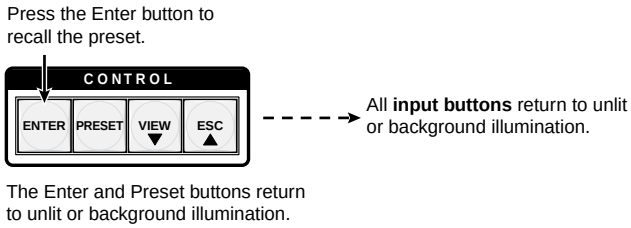
2. **Select *Recall Preset* mode**: Press and release the Preset button.


Preset Assigned
Press and release the Preset button.
PRESET
PRESET
All input and output buttons with assigned presets light **red**.
COMPUTER INPUTS
1 2 3 4 5 6 7 8
1 2 3 4 5 6
COMPUTER/AUDIO OUTPUTS
No Preset Assigned

3. **Select the preset number**: Press and release the input or output button for the desired preset.


Press and release the Input 1 button.
CONTROL
ENTER
PRESET
VIEW
ESC
The Enter button blinks to indicate the need to recall the preset.
The button blinks **red** to indicate that this **preset** number is selected but not recalled.
COMPUTER INPUTS
1 2 3 4 5 6 7 8

4. **Confirm the recalled preset**: Press and release the Enter button. The configuration stored in the selected memory location is now the current configuration and can be viewed in the *View-Only* mode (see example 4).


Press the Enter button to recall the preset.
CONTROL
ENTER
PRESET
VIEW
ESC
All **input buttons** return to unlit or background illumination.
The Enter and Preset buttons return to unlit or background illumination.

Muting and unmuting video and/or audio outputs

Individual outputs can be muted or unmuted as follows:

NOTE *Mutes are protected when front panel* Lock *mode 2 is selected. You can view the status of the output (muted or unmuted) in* Lock *mode 2 but you cannot change it from the front panel. See "Setting the front panel Locks (*Executive *modes)" on page 3-44.*

1. Press the Esc button to clear any input button indications, output button indications, or control button indications that may be on.
2. Select video or audio only to mute or unmute by pressing the Video button and/or the Audio button.
3. Press and release the View button.
4. One at a time, press and **hold** the output button(s) for the desired output(s) for approximately 2 seconds. The output LED(s) for the selected output(s) blink to indicate the mute or return to their previous state to indicate the unmute.
5. Press and release the View button to return to normal switcher operation.

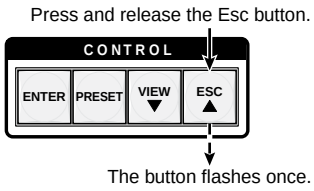
NOTE

- *Video and audio **can** both can be muted, but in separate operations; one and then the other.. Press and release the Video button and the Audio button to select each for muting or unmuting.*
- *If you select Video and Audio in* View-Only *mode and then attempt to mute an output, the mute function will not work.*
- *Video can be muted or unmuted on outputs 1 through 12. Audio is not preset on output 7 through 12, so it **cannot** be muted or unmuted on those outputs.*
- *The audio mute is the same mute function that is available via the DSP Configurator program. See chapter 5, "Switcher Software".*
- *When you enter View-Only mode, the output LEDs turn **on** for all outputs **without** ties.*
- *In the computer video group, the video mute function mutes the R, G, and B planes only; the sync (H and V planes) are still active. In the low resolution video group, the video mute function mutes all composite video and/or S-video planes.*
- *Mutes are saved to non-volatile memory. When power is removed and restored, the mute settings are retained.*

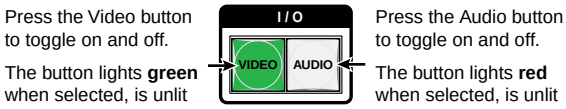
Example 10: Muting and unmuting an output

In the following example, several switcher outputs are muted and unmuted. The steps show the front panel indications that result from your action.

1. **Clear all selections**: Press and release the Esc button.



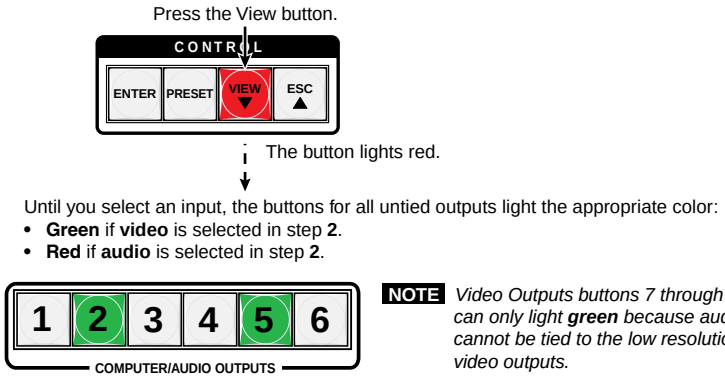
2. **Select video and audio, video only, or audio only**: If necessary, press and release the Video button and/or Audio button.


Press the Video button to toggle on and off.
The button lights **green** when selected, is unlit when deselected.
I/O
VIDEO
AUDIO
Press the Audio button to toggle on and off.
The button lights **red** when selected, is unlit when deselected.

NOTE *Video is selected in this example.*

3. **Select *View-only* mode**: Press and release the View button.

NOTE *This example shows the front panel indications if example 1, example 2, and example 3 have been completed.*

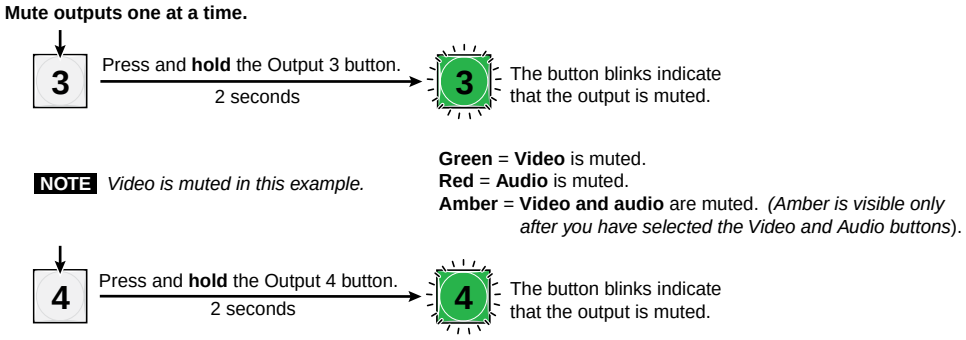


NOTE *Video Outputs buttons 7 through 12 can only light **green** because audio cannot be tied to the low resolution video outputs.*

NOTE *Output mutes are protected when front panel* Lock *mode 2 is selected. You can view the mutes in* Lock *mode 2 but you cannot change them from the front panel. See "Setting the front panel Locks* (Executive *modes)" on page 3-44.*

If front panel Lock *mode 2 is selected and you try to perform steps 4 and 5, the actions are ignored.*

4. **Mute the output**: **One at a time**, press and **hold** the Output 3 and then the Output 4 buttons for approximately 2 seconds until the button starts to blink.

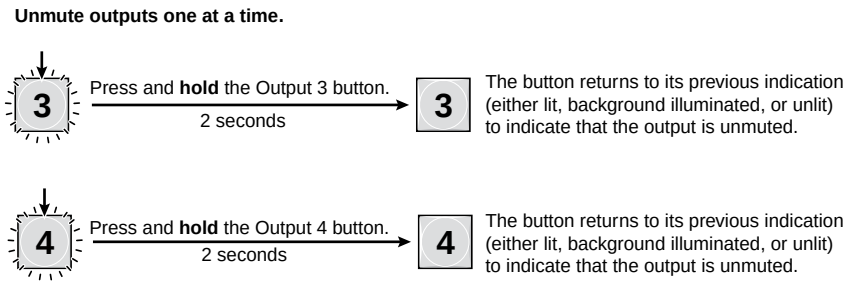

Mute outputs one at a time.
3
Press and hold the Output 3 button.
2 seconds
3
The button blinks indicate that the output is muted.
NOTE Video is muted in this example.
Green = Video is muted.
Red = Audio is muted.
Amber = Video and audio are muted. (Amber is visible only after you have selected the Video and Audio buttons).
4
Press and hold the Output 4 button.
2 seconds
4
The button blinks indicate that the output is muted.

NOTE *If both video and audio are selected and only video is muted, the output button flashes between green and amber. If only audio is muted, the output button flashes between red and amber.*

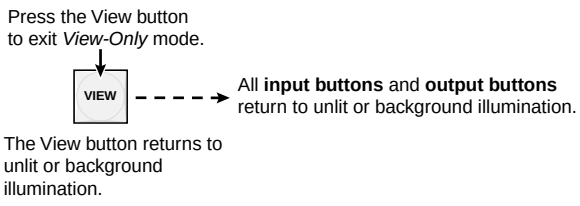
NOTE *Video and audio ties between the low resolution video input group and the low resolution video output group are **always** made with the audio redirected. To mute video and audio, you must mute both the low resolution video output (in outputs 7 through 12) and the computer video/audio outputs group output (in outputs 1 through 6) as follows:*

- *If you mute output 7 video, you must also mute output 1 audio.*
- *If you mute output 8 video, you must also mute output 2 audio.*
- *If you mute output 9 video, you must also mute output 3 audio.*
- *If you mute output 10 video, you must also mute output 4 audio.*
- *If you mute output 11 video, you must also mute output 5 audio.*
- *If you mute output 12 video, you must also mute output 6 audio.*

5. **Unmute the output**: **One at a time**, press and **hold** the Output 3 and then the Output 4 buttons for approximately 2 seconds until the button changes state.


Unmute outputs one at a time.
3
Press and hold the Output 3 button.
2 seconds
3
The button returns to its previous indication (either lit, background illuminated, or unlit) to indicate that the output is unmuted.
4
Press and hold the Output 4 button.
2 seconds
4
The button returns to its previous indication (either lit, background illuminated, or unlit) to indicate that the output is unmuted.

6. **Exit *View-only* mode**: Press and release the View button.


Press the View button to exit View-Only mode.
VIEW
All input buttons and output buttons return to unlit or background illumination.
The View button returns to unlit or background illumination.

Viewing and adjusting the input audio level

The audio level of each input can be displayed and adjusted through a range of -18 dB to +24 dB to ensure that there is no noticeable volume difference among sources (figure 3-6). The audio level can be adjusted from the front panel or under serial port or Ethernet control.

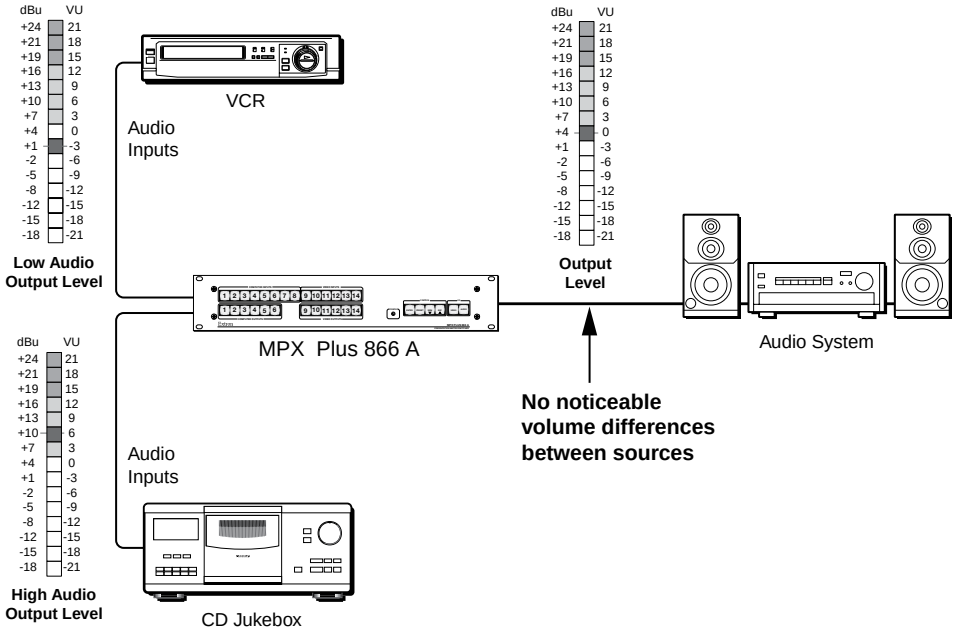
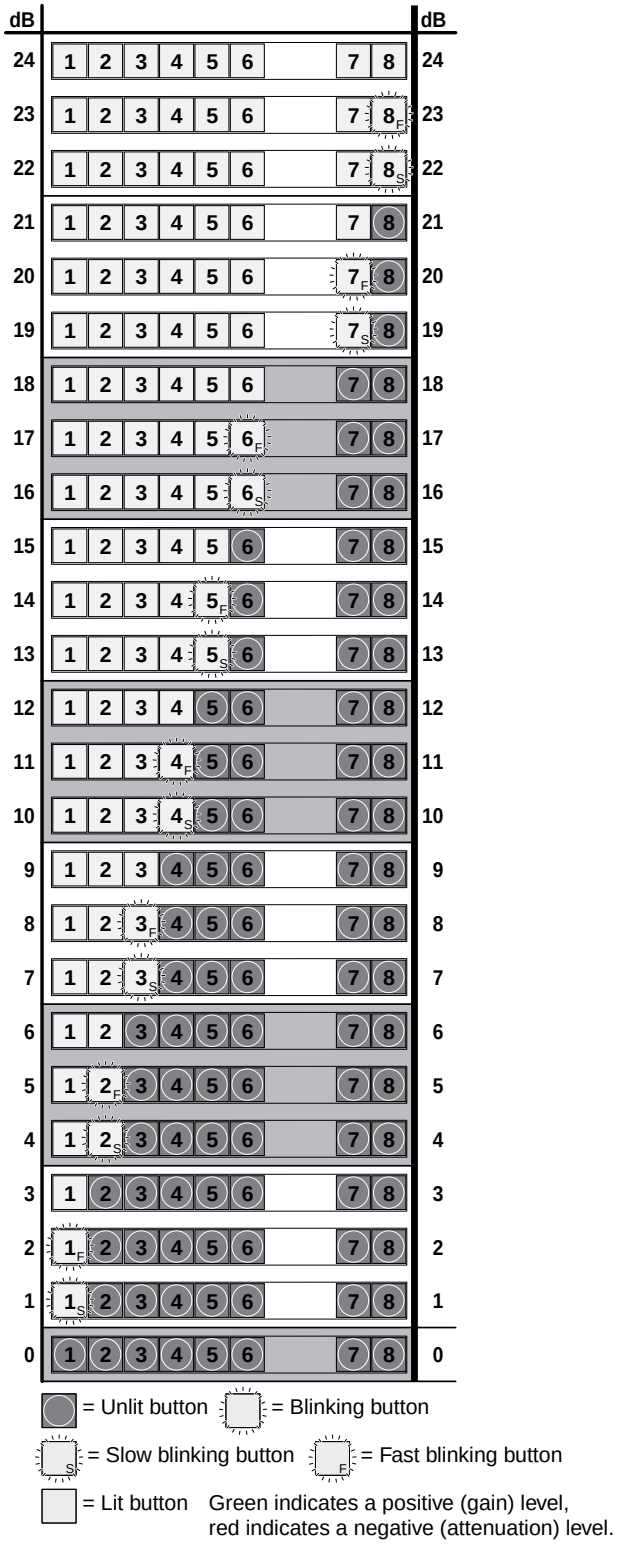


Figure 3-6 — Audio gain and attenuation

1. Press the Esc button to clear any input buttons, output buttons, or control buttons that may be lit.
2. To enter *Audio* mode, press and **hold** the Audio button until the button begins to blink red, then release the button.
3. Press and release an input button to select an input. The output buttons display audio level and polarity (+ or –) for the selected input. Each output button indicates 1 dB of gain or attenuation when blinking slowly, 2 dB when blinking quickly, and 3 dB when lit steadily. Green output buttons indicate a gain (+) audio level and red buttons indicate an attenuation (–) level. See the table on the next page.
4. Press and release the Esc (▲) and View (▼) buttons to increase and decrease the audio level.
5. Press and release the Audio button to exit the *Audio* mode. The Audio button stops blinking.

Input audio level adjustment displays



NOTE

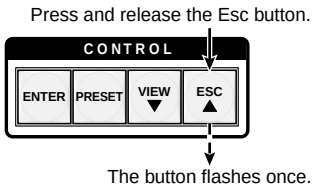
- *Pressing the Enter or Preset button also exits Audio mode. Pressing the Preset button changes to Recall Preset mode.*
- *When adjusted from the front panel, there is one audio level setting per input. The audio level setting is shared by the left and right audio inputs.*
- *Individual controls, offering finer trim adjustments (in 0.1 dB increments) for the right and left channels and group master offsets are present in the DSP and available through software control (see "DSP Configurator Program", in chapter 5, "Switcher Software"). These controls are not shown in the front panel display.*
- *The audio level settings are stored in non-volatile memory. When power is removed and restored, the audio level settings are retained.*
- *Pressing the Audio button always returns the I/O buttons to Video lit green and Audio lit red (video and audio selected for configuration).*

Example 11: Viewing and adjusting an input audio level

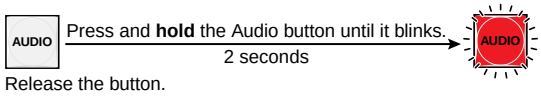
In the following example, an audio level is viewed and adjusted. The steps show the front panel indications that result from your action.

The output buttons display the level as shown in the table on page 3-35. Output buttons lit green indicate gain; output buttons lit red indicate attenuation.

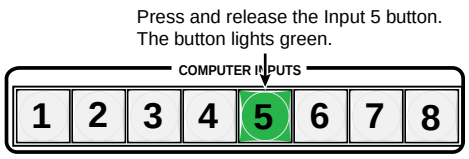
1. **Clear all selections**: Press and release the Esc button.



2. **Select *Audio* mode**. Press and **hold** the Audio button for approximately 2 seconds.



3. **Select an input**: Press and release the input 5 button.



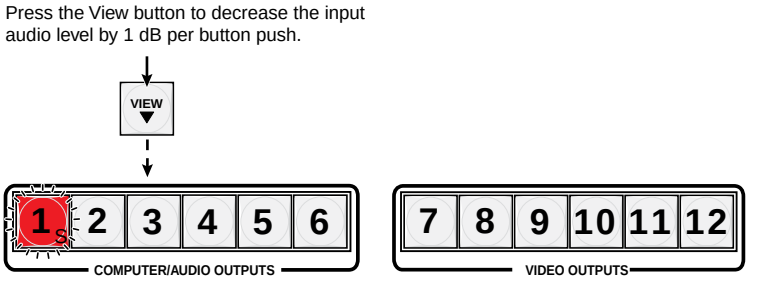
The output buttons display the selected input's audio level and polarity (gain or attenuation).

- Each output button indicates 1 dB when blinking slowly, 2 dB when blinking quickly, and 3 dB when lit.
  When the buttons are lit or blinking **green**, they indicate a **gain (+)** audio level.
  When the output buttons are lit or blinking **red**, they indicate an **attenuation (-)** level.
- In this example, the output buttons display an audio gain level of +8 dB.

4. **Change the audio level**: Press and release the View (▼) button once to decrease the input audio level by 1 dB.

   Press and release the View (▼) button several more times to decrease the input audio level by 1 dB per push of the button. Note the output button indication changes that occur each time the View (▼) button is pressed.

   The figure below shows the result of pressing the View (▼) button a total of 9 times. Note that the level is now displayed in red to indicate a negative level.



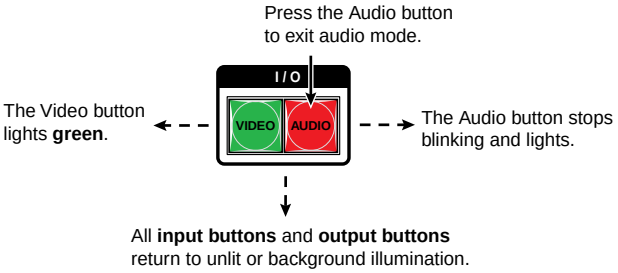
The output buttons display the selected input's audio level and polarity (gain or attenuation).

- Each output button indicates 1 dB when blinking slowly, 2 dB when blinking quickly, and 3 dB when lit.

  When the buttons are lit **green**, they indicate a **gain (+)** audio level.

  When the output buttons are lit **red**, they indicate an **attenuation (-)** level.
- In this example, the output buttons display an audio attenuation level of -1 dB.

5. **Deselect *Audio* mode**: Press and release the Audio button.


Press the Audio button to exit audio mode.
I / O
VIDEO
AUDIO
The Video button lights **green**.
The Audio button stops blinking and lights.
All **input buttons** and **output buttons** return to unlit or background illumination.

Viewing and adjusting the output volume

The audio level of each output can be displayed and adjusted through a range of 100% (no attenuation) to 0% (maximum [100 dB] attenuation). The audio level can be adjusted from the front panel or under RS-232 or Ethernet control.

NOTE *Output volume is protected when front panel* Lock *mode 2 is selected. You can view the volume in* Lock *mode 2 but you cannot adjust it from the front panel. See "Setting the front panel Locks (*Executive *modes)" on page 3-44.*

1. Press the Esc button to clear any input buttons, output buttons, or control buttons that may be lit.
2. To enter *Audio* mode, press and hold the Audio button until the button begins to blink red, then release the button.
3. Press and release an output button in the computer video/audio output group to select an output. The input buttons display the volume level for the selected output; the more buttons that are lit, the higher the volume. The fewer buttons that are lit, the lower the volume.

   For a more detailed analysis of decoding the displayed value, see "Reading the displayed volume" on the next page.
4. Press and release the Esc (▲) and View (▲) buttons to increase and decrease the audio volume.
5. Press and release the Audio button to save the audio settings and exit the *Audio* mode. The Audio button stops blinking.

NOTE

- *When adjusted from the front panel, there is one audio level setting per input. The audio level setting is shared by the left and right audio outputs.*
- *Individual controls, offering finer trim adjustments (in 0.1 dB increments) for the right and left channels and group master offsets are present in the DSP and available through software control (see "DSP Configurator Program", in chapter 5, "Switcher Software"). These controls are not shown in the front panel display.*
- *The audio volume levels are stored in non-volatile memory. When power is removed and restored, the audio level settings are retained.*
- *Exiting* Audio *mode by pressing the Audio button always returns the I/O buttons to Video lit green and Audio lit red (video and audio selected for configuration).*
- *Pressing the Enter or Preset button also exits* Audio *mode. Pressing the Preset button changes to* Recall Preset *mode.*

Reading the displayed volume

NOTE *This section is a detailed look at reading the output volume display on the switcher's front panel. If you do not need to read the exact value of the volume setting, skip this section.*

There are 65 steps of volume attenuation, with 1 dB per step (button push), except for step 0-to-1, which is 37 dB. At maximum attenuation, no input buttons are lit, 100 dB of attenuation is applied, and the audio output is effectively muted. At no attenuation, input buttons 1 through 12 are lit and the output volume is equal to the input signal plus any gain or attenuation that is applied to that specific input using the input audio level adjustment. See "Viewing and adjusting the input audio level".

See the table on the next page. The input buttons blink or light sequentially to indicate the approximate volume of the selected output. Volume is defined as a percentage of the input audio signal that is applied to the output. From 0% of volume, the first Esc (▲) button push applies 5.5% of the input audio signal. From 5.5% on, each Esc (▲) push applies 1.5% more of the input audio signal to the output:

- **Push Esc (▲) button again —** 5.5% + 1.5% = 7% volume, indicated by the Input 1 button blinking slowly.
- **Push Esc (▲) button twice more —** 7% + 1.5% + 1.5% = 10% volume, indicated by the Input 1 button blinking quickly.
- **Push Esc (▲) button nineteen times more —** 10% + (19•1.5%) = 38.5% volume, indicated by the Input 1 through 4 buttons lit steadily.

When 12 input buttons are lit, the audio output is 100% of the audio input level.

Another way to view the volume level is to think in terms of the attenuation that is applied to the output. Attenuation is indicated by the lit or blinking input buttons: when fewer input buttons are lit, attenuation is greater (and the volume is quieter).

- At minimum volume all input buttons are unlit or background illuminated and the audio output is effectively muted.
- The first step of volume increase causes the Input 1 button to blink slowly. Attenuation is reduced by 37 dB (63 dB of attenuation is applied to the output).
- The second step of volume increase reduces the attenuation by an additional 1 dB (62 dB of attenuation is applied to the output).
- Successive steps of volume increase cause consecutive buttons to first blink, then light steadily.
- At full volume, no attenuation is applied to the output and all input buttons light steadily.

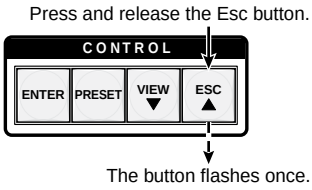
Audio volume adjustment settings

Highest # input button lit	dB of attenuation	Output volume	Highest # input button lit	dB of attenuation	Output volume
None	100	0%			
1 Slow blink	63	5.5%	6 Fast blink	31	53.5%
	62	7%	6	30	55%
1 Fast blink	61	8.5%	7 Slow blink	29	56.5%
	60	10%		28	58%
1	59	11.5%	7 Fast blink	27	59.5%
2 Slow blink	58	13%		26	61%
	57	14.5%	7	25	62.5%
2 Fast blink	56	16%	8 Slow blink	24	64%
	55	17.5%		23	65.5%
	54	19%	8 Fast blink	22	67%
2	53	20.5%		21	68.5%
3 Slow blink	52	22%	8	20	70%
	51	23.5%	9 Slow blink	19	71.5%
3 Fast blink	50	25%		18	73%
	49	26.5%	9 Fast blink	17	74.5%
	48	28%		16	76%
3	47	29.5%	9	15	77.5%
4 Slow blink	46	31%	10 Slow blink	14	79%
	45	32.5%		13	80.5%
4 Fast blink	44	34%	10 Fast blink	12	82%
	43	35.5%		11	83.5%
	42	37%	10	10	85%
4	41	38.5%	11 Slow blink	9	86.5%
5 Slow blink	40	40%		8	88%
	39	41.5%	11 Fast blink	7	89.5%
5 Fast blink	38	43%		6	91%
	37	44.5%	11	5	92.5%
	36	46%	12 Slow blink	4	94%
5	35	47.5%		3	95.5%
6 Slow blink	34	49%	12 Fast blink	2	97%
	33	50.5%		1	98.5%
6 Fast blink	32	52%	12	0	100%

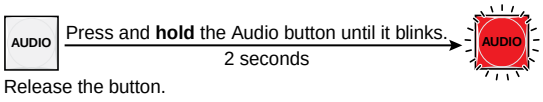
Example 12: Viewing and adjusting an output volume level

In the following example, the audio output volume is viewed and adjusted. The steps show the front panel indications that result from your action. See the table on page 3-40 to read the displayed audio output volume.

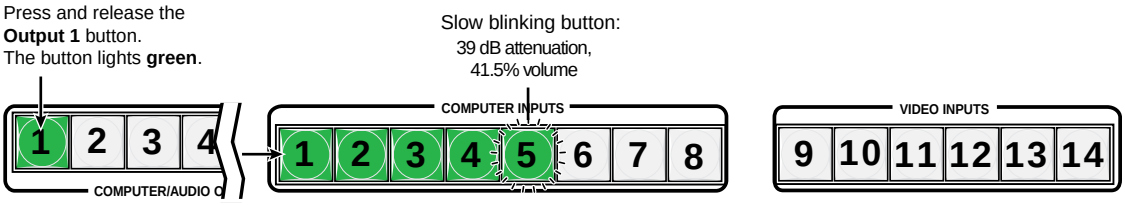
1. **Clear all selections**: Press and release the Esc button.



2. **Select *Audio* mode**. Press and hold the Audio button for approximately 2 seconds.



3. **Select an output**: Press and release the output 1 button.



- The input buttons display the selected output's audio volume level.
- In this example, the **lit** and **blinking** input buttons indicate 40 to 41.5 percent of the applied audio input.
- The **unlit** and **unblinking** input buttons indicate an audio volume **attenuation** of 39 dB to 40 dB.

NOTE *Volume is protected when front panel* Lock *mode 2 is selected. You can view the volume in* Lock *mode 2 but you cannot change it from the front panel. See "Setting the front panel Locks (*Executive *modes)" on page 3-44.*

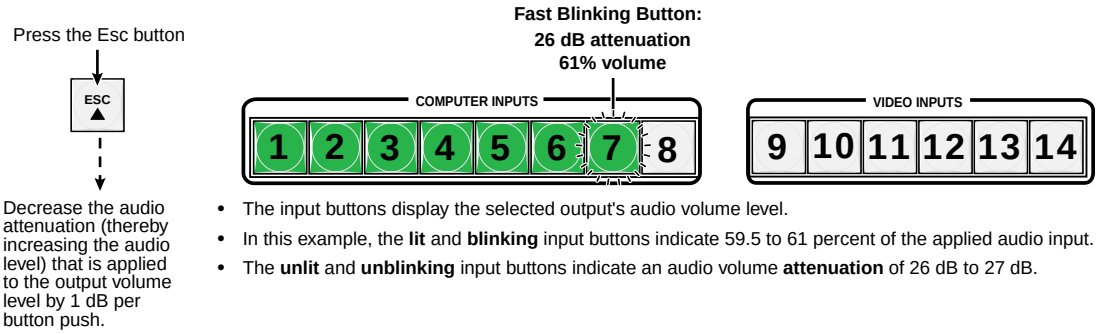
If front panel Lock *mode 2 is selected and you try to perform step* ***4****, the actions are ignored and the Enter, Video, and Audio buttons flash.*

4. **Change the volume level**: Press and release the Esc (▲) button once to increase the volume by 1.5%.

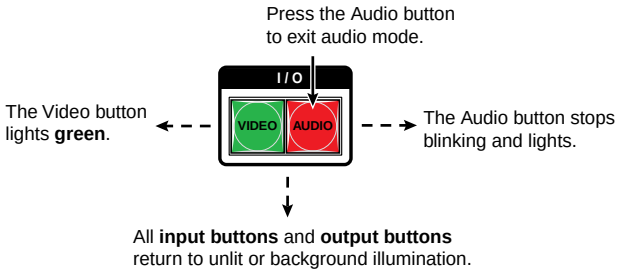
   Press and release the Esc (▲) button several more times to increase the volume by 1.5% per button push. Note the input button indication changes that occur each time the Esc (▲) button is pressed and released.

NOTE *You can press and hold the Esc (▲) or View (▼) button to ramp the level up or down by 3 dB per second to the high or low limit.*

The figure below shows the result of pressing the Esc (▲) button a total of 13 times.


Press the Esc button
ESC
Decrease the audio attenuation (thereby increasing the audio level) that is applied to the output volume level by 1 dB per button push.
Fast Blinking Button:
26 dB attenuation
61% volume
COMPUTER INPUTS
1 2 3 4 5 6 7 8
VIDEO INPUTS
9 10 11 12 13 14
• The input buttons display the selected output's audio volume level.
• In this example, the lit and blinking input buttons indicate 59.5 to 61 percent of the applied audio input.
• The unlit and unblinking input buttons indicate an audio volume attenuation of 26 dB to 27 dB.

5. **Deselect *Audio* mode**: Press and release the Audio button.

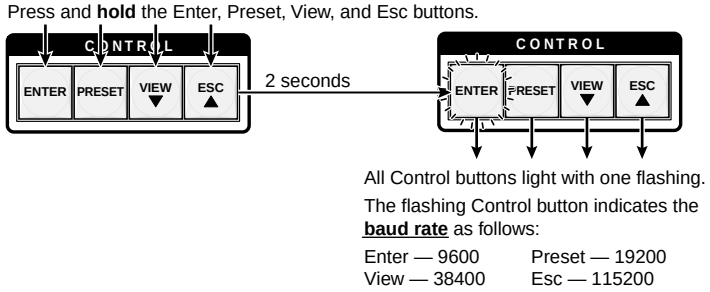

Press the Audio button to exit audio mode.
I/O
VIDEO
AUDIO
The Video button lights green.
The Audio button stops blinking and lights.
All input buttons and output buttons return to unlit or background illumination.

Selecting the RS-232 Primary port's baud rate

The matrix switcher supports the RS-232 serial communication protocol on the front panel Configuration port and the rear panel RS-232 Primary and RS-232 Secondary ports. All three ports can operate at 9600, 19200, 38400, and 115200 baud. The baud rate for the RS-232 Primary port can be viewed and changed from the front panel.

View and configure the RS-232 Primary port's baud rate as follows:

1. **Select *Serial Port Configuration* mode**: Simultaneously press and **hold all** Control buttons (Enter, Preset, View, and Esc).


Press and hold the Enter, Preset, View, and Esc buttons.
CONTROL
ENTER PRESET VIEW ESC
2 seconds
CONTROL
ENTER PRESET VIEW ESC
All Control buttons light with one flashing.
The flashing Control button indicates the baud rate as follows:
Enter — 9600
Preset — 19200
View — 38400
Esc — 115200

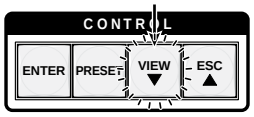
2. Release the Control buttons.

3. **Change the baud rate**: Press and release the button that relates to the desired value.

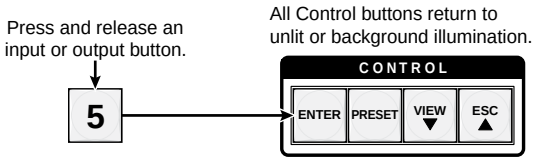
Baud rate:
Enter — 9600 Preset — 19200
View — 38400 Esc — 115200

The selected button blinks and the others remain lit.

In this example, the port is set to 38400 baud.



4. **Deselect *Serial Port Configuration* mode**: Press and release an input or output button.



NOTE *The switcher requires some time to save the new serial port settings. Wait at least 5 minutes before removing power from the switcher or the settings may be lost.*

Setting the front panel locks (*Executive* modes)

The matrix switchers have three levels of front panel security lock that limit the operation of the switcher from the front panel. The three levels are:

- ***Lock* mode 0 —** The front panel is completely unlocked. All front panel functions are available.
- ***Lock* mode 1 —** All changes are locked from the front panel (except for setting *Lock* mode 2). Some functions can be viewed.
- ***Lock* mode 2 —** Basic functions are unlocked. Advanced features are locked and can be viewed only.

  Basic features consist of:

  - Making ties
  - Recalling presets
  - Setting input audio gain and attenuation
  - Changing *Lock* modes

  Advanced features consist of:

  - Setting RGB delay
  - Saving presets
  - Setting video and audio output mutes
  - Setting audio output volume
  - Setting the rear panel remote port baud rate

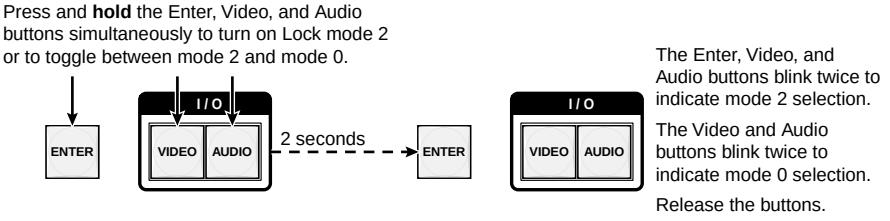
NOTE *The switcher is shipped from the factory in* Lock *mode 2.*

Selecting *Lock* mode 2 or toggling between mode 2 and mode 0

NOTE *If the switcher is in* Lock *mode 0 or mode 1, this procedure selects mode 2.*

If the switcher is in Lock *mode 2, this procedure selects mode 0 (unlocks the switcher).*

Change the *Lock* mode, as shown:


Press and **hold** the Enter, Video, and Audio buttons simultaneously to turn on Lock mode 2 or to toggle between mode 2 and mode 0.
ENTER
I / O
VIDEO
AUDIO
2 seconds
ENTER
I / O
VIDEO
AUDIO
The Enter, Video, and Audio buttons blink twice to indicate mode 2 selection.
The Video and Audio buttons blink twice to indicate mode 0 selection.
Release the buttons.

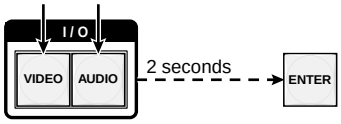
Selecting *Lock* mode 2 or toggling between mode 2 and mode 1

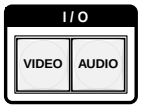
NOTE *If the switcher is in* Lock *mode 0 or mode 1, this procedure selects mode 2.*

If the switcher is in Lock *mode 2, this procedure selects mode 1.*

Change the *Lock* mode, as shown:

Press and **hold** the Video and Audio buttons simultaneously to turn on Lock mode 2 or to toggle between mode 1 and mode 2.





The Enter, Video, and Audio buttons blink twice to indicate mode 2 selection.

The Video and Audio buttons blink twice to indicate mode 1 selection.

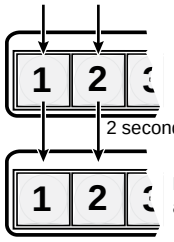
Release the buttons.

Background illumination

The buttons on the front panel can be set to provide amber background illumination at all times or the background illumination can be turned off.

Toggle the background illumination on and off as shown:

Press and **hold** the Input 1 and Input 2 buttons simultaneously to toggle background illumination mode on or off.



Release the Input 1 and Input 2 buttons.

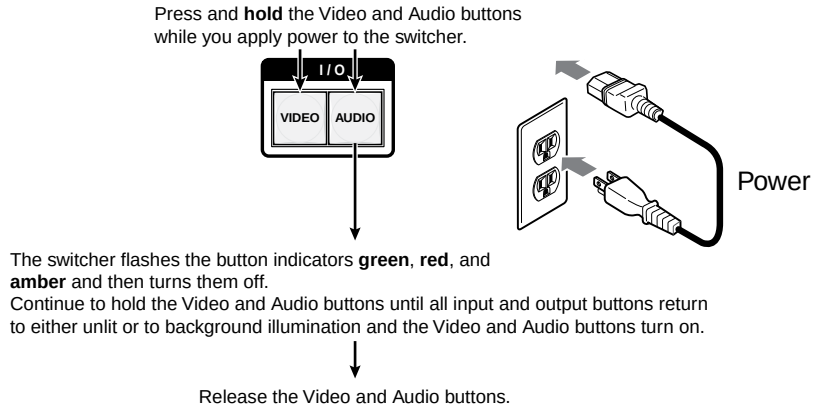
Performing a system reset from the front panel

The front panel reset is identical to the Esc ZXXX ← SIS command (see chapter 4, "SIS Programming and Control"). A system reset:

- Clears all ties
- Clears all presets
- Clears all video and audio mutes
- Sets all input audio levels to unity gain (+0 dB)
- Sets all output volume levels to 100% (0 dB of attenuation).

Reset the switcher to the factory default settings by pressing and **holding** the Video button and Audio button **while** you apply AC power to the switcher.

NOTE *System reset does not reset the Internet protocol (IP) settings or replace user-installed firmware.*


Press and **hold** the Video and Audio buttons while you apply power to the switcher.
I / O
VIDEO
AUDIO
Power
The switcher flashes the button indicators **green**, **red**, and **amber** and then turns them off.
Continue to hold the Video and Audio buttons until all input and output buttons return to either unlit or to background illumination and the Video and Audio buttons turn on.
Release the Video and Audio buttons.

Rear Panel Operations

The rear panel has a Reset button that initiates four levels of resets (numbered 1, 3, 4, and 5 for the sake of comparison with an Extron IPL product). The Reset button is recessed, so use a pointed stylus, ballpoint pen, or Extron Tweeker to access it.

See the following table for a summary of the modes.

CAUTION *Review the reset modes carefully. Using the wrong reset mode may result in unintended loss of flash memory programming, port reassignment, or a controller reboot.*

NOTE *The reset modes listed below close all open IP and Telnet connections and close all sockets. Also, the following modes are separate functions, not a continuation from Mode 1 to Mode 5.*

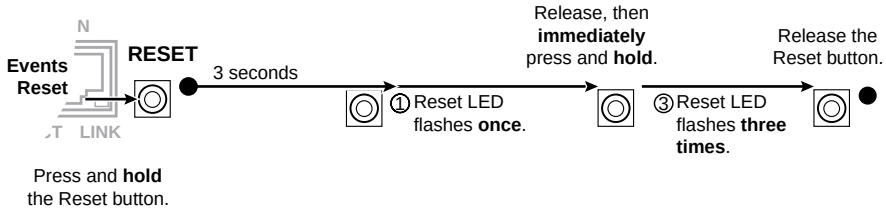
Reset Mode Comparison/Summary

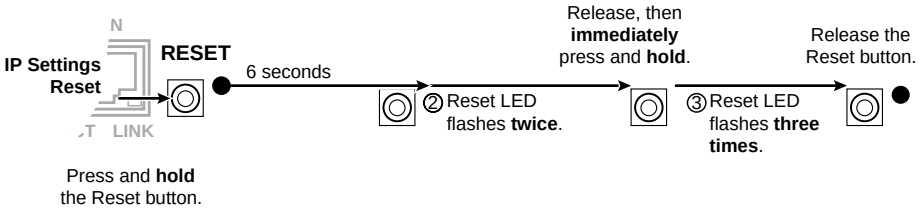
Mode	Activation	Result	Purpose/Notes
1	Hold down the recessed Reset button while applying power to the switcher. **NOTE** *After a mode 1 reset is performed, update the switcher's firmware to the latest version. **Do not** operate the switcher firmware version that results from the mode 1 reset. If you want to use the factory default firmware, you must upload that version again. See chapter 5, "Switcher Software", for details on uploading firmware.*	**The switcher reverts to the factory default firmware.** Event scripting will not start if the switcher is powered on in this mode. All user files and settings, such as IP settings, are maintained. **NOTE** *If you do not want to update firmware, or you performed a mode 1 reset by mistake, cycle power to the switcher to return to the firmware version that was running before the mode 1 reset. Use the 0Q SIS command to confirm that the factory default firmware is no longer running (look for the asterisk [*] following the version number.*	Use mode 1 to revert to the factory default firmware version if incompatibility issues arise with user-loaded firmware.
3	Hold down the Reset button for about 3 seconds, until the Reset LED blinks once, then press Reset momentarily (<1 second) within 1 second.	**Mode 3 turns events on or off.** During resetting, the Reset LED flashes two times if events are starting, three times if events are stopping.	Mode 3 is useful for troubleshooting.
4	Hold down the Reset button for about 6 seconds, until the Reset LED blinks twice (once at 3 seconds and again at 6 seconds). Then press Reset momentarily (<1 second) within 1 second.	**Mode 4:** • Enables ARP capability. • Sets the IP address to the factory default. • Sets the subnet address to the factory default. • Sets the gateway address to the factory default. • Sets port mapping to the factory default. • Turns DHCP off. • Turn events off. The Reset LED flashes three times in quick succession during the reset.	Mode 4 enables you to set IP address information using ARP and the MAC address.
5	Hold down the Reset button for about 9 seconds, until the Reset LED blinks three times (once at 3 seconds, again at 6 seconds, and then again at 9 seconds). Then press Reset momentarily (<1 second) within 1 second.	**Mode 5 performs a complete reset to factory defaults (with the exception of the firmware):** • Does everything mode 4 does. • Resets most settings including: clears all ties and presets clears all output mutes • Resets all IP options. • Removes/clears all files for the switcher. The reset LED flashes three times in quick succession during the reset.	Mode 5 is useful if you want to start over with configuration and uploading or to replace events. Same as Esc ZQQQ ← SIS command, see chapter 4, "SIS Programming and Control".

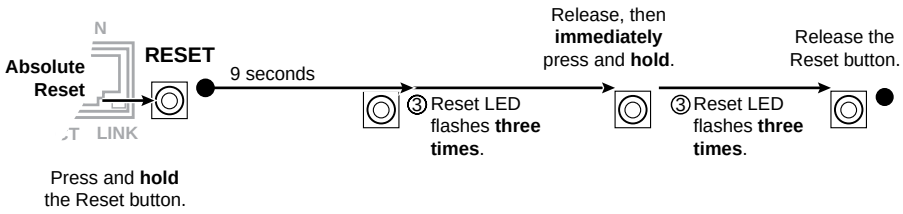
Performing soft system resets (resets 3, 4, and 5)

Perform a soft reset of the switcher as follows:

1. Use an Extron Tweeker or other small screwdriver to press and hold the rear panel Reset button until the rear panel Reset LED and the front panel Video and Audio buttons blink once (events reset), twice (system reset), or three times (absolute reset).







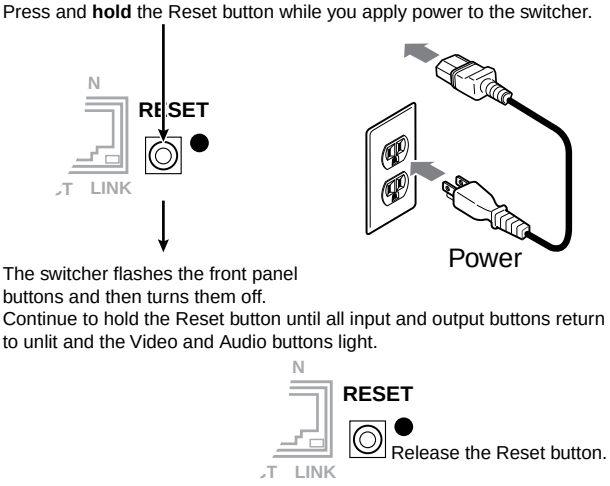
2. Release the Reset button and then immediately press and release the Reset button again. Nothing happens if the second momentary press does not occur within 1 second.

Performing a hard reset (reset 1)

The hard reset function restores the switcher to the base firmware that it was shipped with. After a hard reset, events do not automatically start, but user settings and files are restored. Perform a hard reset as follows:

NOTE *The hard reset restores the factory-installed firmware. The switcher reverts to that factory firmware the next time power is cycled off and on* ***unless*** *a firmware update is performed before the power cycle.*

1. If necessary, turn off power to the switcher.
2. Press and **hold** the Reset button on the rear panel **while** you apply AC power to the switcher.


Press and **hold** the Reset button while you apply power to the switcher.
N
RESET
T LINK
Power
The switcher flashes the front panel buttons and then turns them off.
Continue to hold the Reset button until all input and output buttons return to unlit and the Video and Audio buttons light.
N
RESET
T LINK
Release the Reset button.

Optimizing the Audio

NOTE *This section addresses only the front panel controls for optimizing video. For setting the digital signal processor adjustments, see "Optimizing the Audio" in chapter 5, "Switcher Software".*

Each individual input audio level can be adjusted within a range of -18 dB to +24 dB, so there are no noticeable volume differences between sources and for the best headroom and signal-to-noise ratio. Adjust the audio gain and attenuation as follows:

1. Connect audio sources to all desired inputs and connect the audio outputs to output devices such as audio players. See "Audio input and output connections", in chapter 2, "Installation". For best results, wire all of the inputs and the outputs balanced.
2. Power on the audio sources, the switcher, and the audio players.
3. Switch among the inputs (see "Creating a configuration", in this chapter), listening to the audio with a critical ear or measuring the output audio level with test equipment, such as a VU meter.
4. As necessary, adjust the input audio level of each input (see "Viewing and adjusting the input audio level", in this chapter) so that the approximate output level is the same for all selected inputs.
5. As necessary, adjust the output audio level of each output (see "Viewing and adjusting the output volume", in this chapter).

Troubleshooting

This section gives recommendations on what to do if you have problems operating the switcher.

1. Ensure that all devices are plugged in and powered on. The switcher is receiving power if any of the front panel button indicators are lit.
2. Check to see if one or more outputs are muted.
3. Ensure an active input is selected for output on the switcher.
4. Ensure that the proper signal format is supplied.
5. Check the cabling and make corrections as necessary.
6. Call the Extron S^3 Sales & Technical Support Hotline if necessary. See the rear cover of this manual for the phone number in your region of the world.

Configuration Worksheets

Rather than trying to remember the configuration for each preset, use worksheets to record this information. Make copies of the blank worksheet on page 3-54 and use one for each preset configuration. Cross out all unused or inactive inputs and outputs. Use different colors for video and audio and for computer video and low resolution video.

Worksheet example 1: System equipment

Figure 3-7 shows a worksheet in a fictional organization with the system hardware annotated. Input 3 and 7, mic/line inputs 17 and 18, and outputs 10 and 11 have no connections in this organization, so they have been crossed out on the worksheet.

Computer video group inputs include PCs, wall boxes, and an Extron VTG 400. The low resolution video group inputs include cameras, a VCR, a DVD player, and an audio CD player. Computer video group output devices include monitors, projectors, a stereo, and a VCR for recording presentations. The low resolution video group includes low resolution monitors and audio tape,

The VTG 400 video test generator connected to input 8 or to input 13 enables a video test pattern to be sent to one, several, or all output devices within the video group for problem isolation or adjustment purposes. An audio test tape or CD could be used in a similar manner to check out the audio components connected to the computer video/audio group.

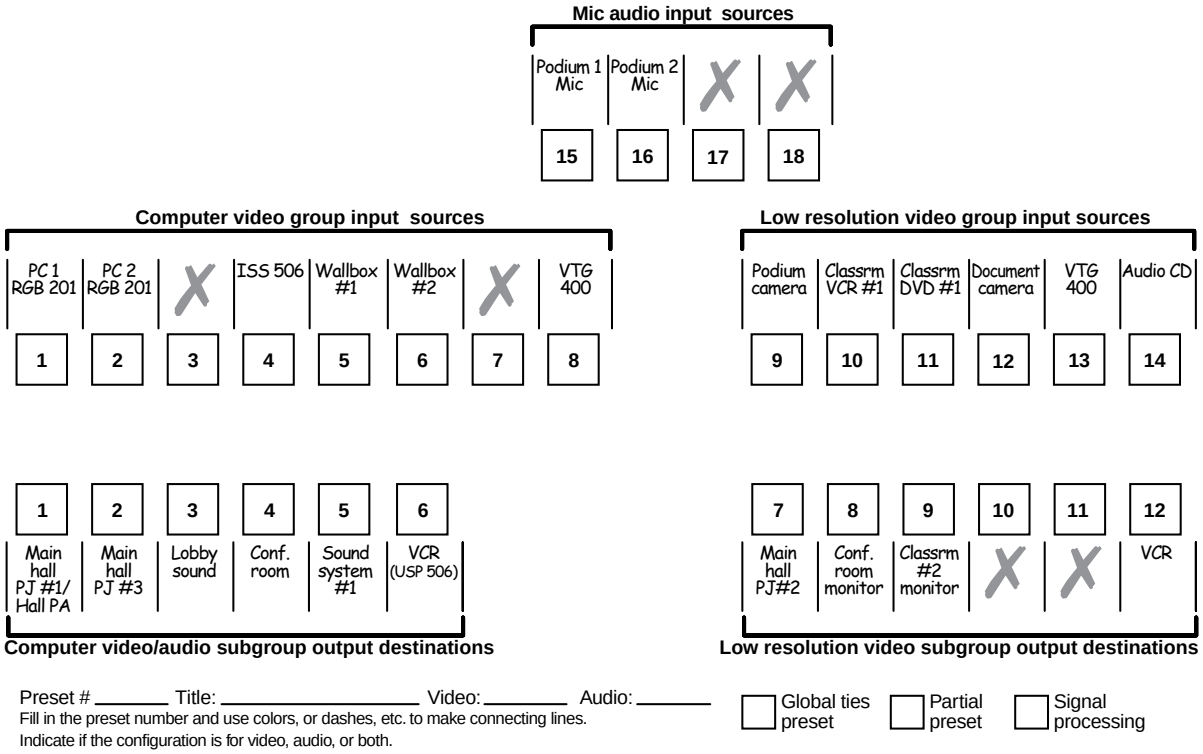


Figure 3-7 — Worksheet example 1: System equipment

Worksheet example 2: Daily configuration

Figure 3-8 continues from worksheet example 1 by showing the video and audio ties that make up the configuration of preset 1. A black line shows video ties and a red line shows the audio ties.

In this example:

- The image of the presenter, from the main podium camera (low resolution video input 9), is:
  - Displayed in the main hall (low resolution output 7)
  - Displayed to the overflow crowd in the conference room (low resolution output 8)
  - Tied to the VCR (low resolution output 12) for recording
- The presenter has a presentation on her laptop computer (computer video input 1) that is displayed:
  - Displayed in the main hall (computer video outputs 1 and 2)
  - Displayed to the overflow crowd in the conference room (computer video output 4)
  - Tied, through a scaler, to a VCR (computer video output 6) for recording
- The audio from her microphone (input 16) is:
  - Played in the hall (output 1)
  - Distributed by the sound system (output 5)
  - Sent to the VCR (output 6)
- Music from the CD player (input 14) is played in the lobby (output 3)

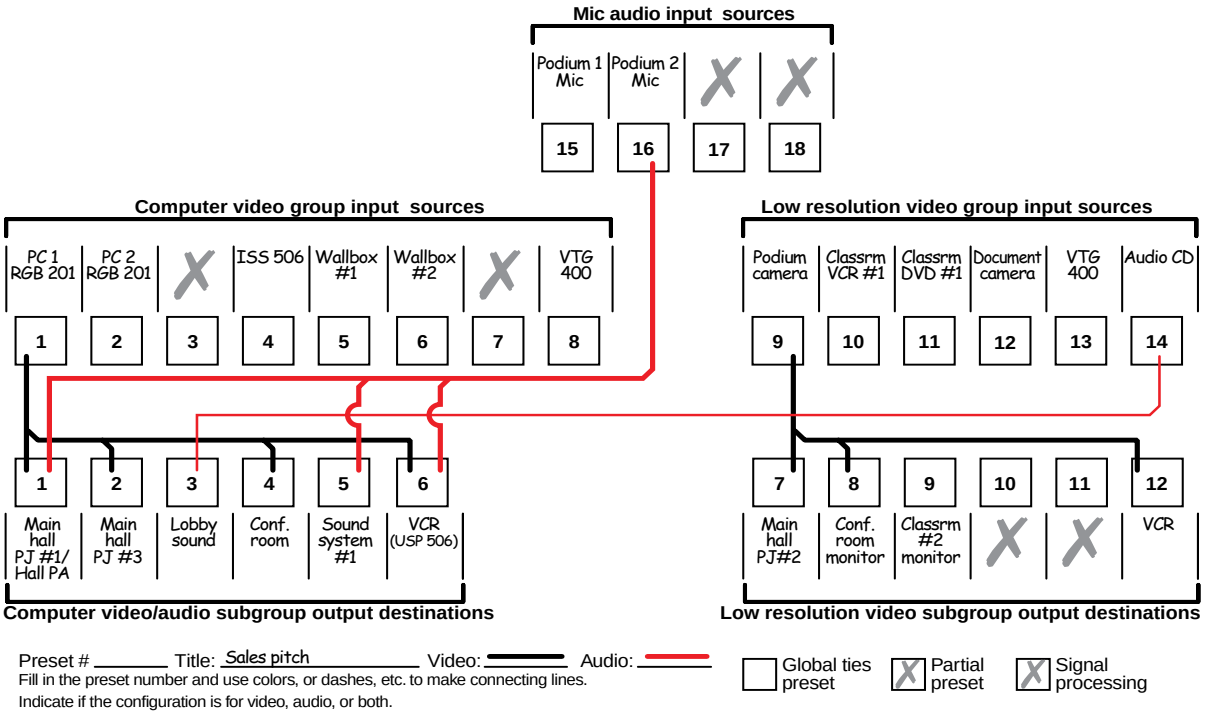


Figure 3-8 — Worksheet example 2: Daily configuration

Worksheet example 3: Test configuration

The A/V system in our fictional organization needs to be fine tuned on a regular basis. Figure 3-9 shows a typical test configuration, with an Extron video test generator (inputs 8 and 13) connected to each video group. Each VTG generates a test pattern of the appropriate resolution to all connected outputs. Sound checks are run from the CD player (input 14) to both output devices that accept audio, with the exception of the VCRs (outputs 3 and 4) regardless of video group.

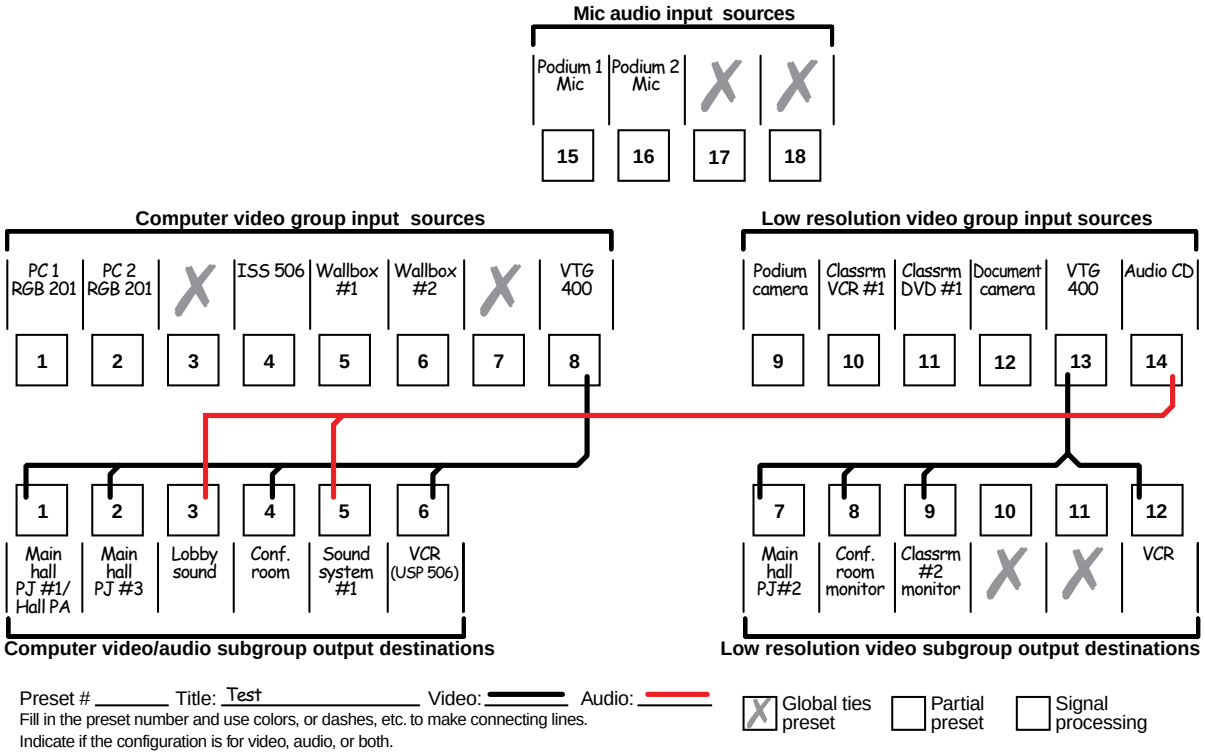
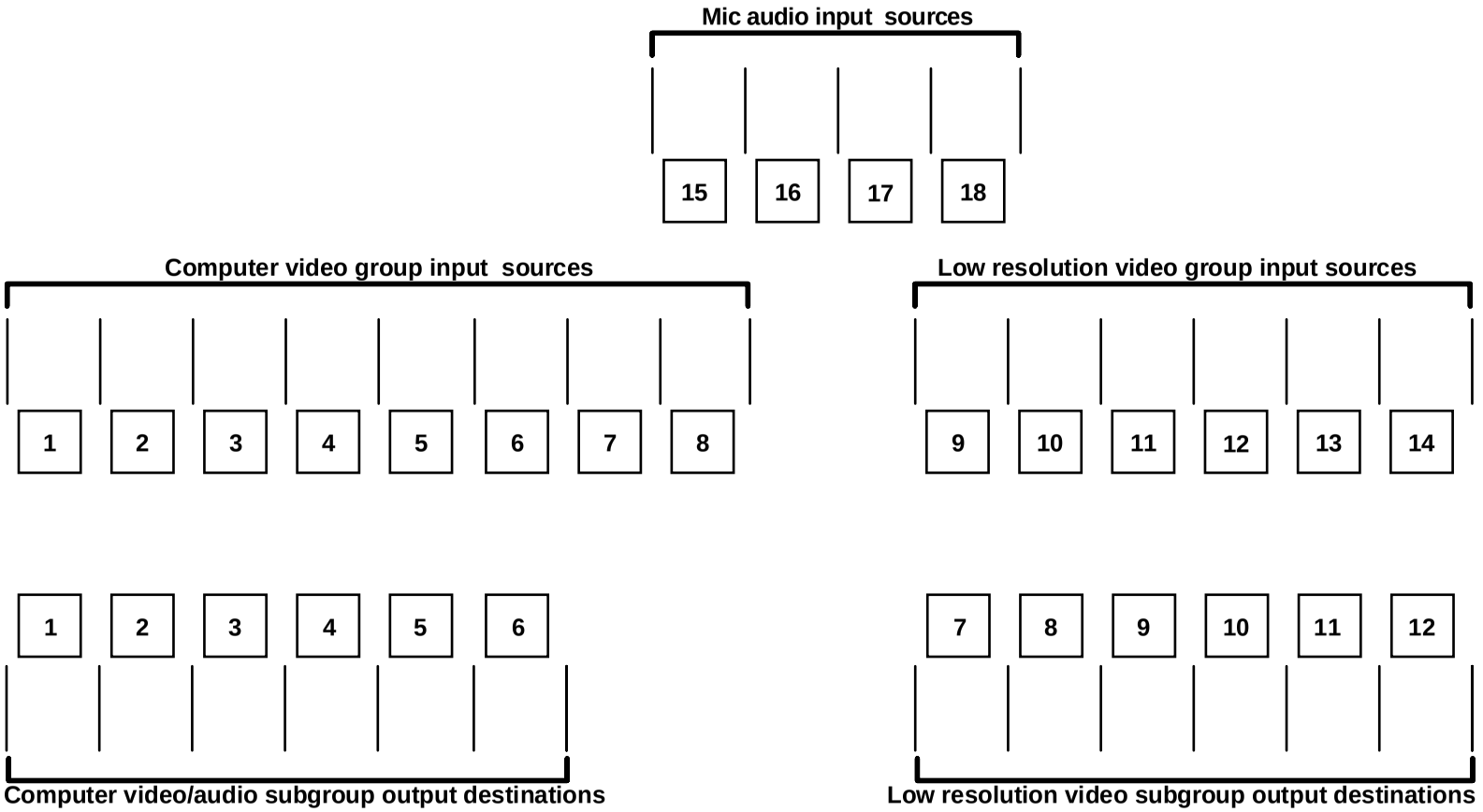


Figure 3-9 — Worksheet example 3: Test configuration



Blank configuration worksheet

4

Chapter Four

SIS Programming and Control

RS-232 Ports

Ethernet (LAN) Port

Host-to-Switcher Instructions

Switcher-Initiated Messages

Switcher Error Responses

Using the Command/Response Tables

Special Characters

RS-232 Ports

The switcher has three serial ports that can be connected to a host device such as a computer running the HyperTerminal utility, an RS-232 capable PDA, or a control system. These ports make serial control of the switcher possible. The serial ports are:

- two (Primary and Secondary) rear panel RS-232 ports on 3-pin captive screw connectors
- the front panel **Configuration (RS-232) port, a** 2.5 mm mini stereo jack

The default protocol for all ports is as follows:

- 9600 baud
- no parity
- 8 data bits
- 1 stop bit
- no flow control

The RS-232 ports can be configured to operate at the 9600, 19200, 38400, or 115200 baud rate.

NOTE *These three ports are hardwired for RS-232 only.*

The rear panel RS-232 Secondary port is active only if the front panel Configuration port is not in use. If a front panel configuration connection is made, the rear panel RS-232 Secondary port becomes inactive and the front panel Configuration port is active.

NOTE *The switcher can operate at 9600, 19200, 38400, or 115200 baud rates, but Extron recommends leaving these ports at 9600 baud only.*
See "Selecting the RS-232 Primary port's baud rate" in chapter 3, "Operation", to configure the RS-232 Primary port from the front panel.
See the "Set serial port parameters" command on page 4-20 to configure all of the ports using an SIS command.

Rear panel Remote ports

NOTE *See "Selecting the RS-232 Primary port's baud rate", in chapter 3, "Operation", to configure the RS-232 Primary port from the front panel.*

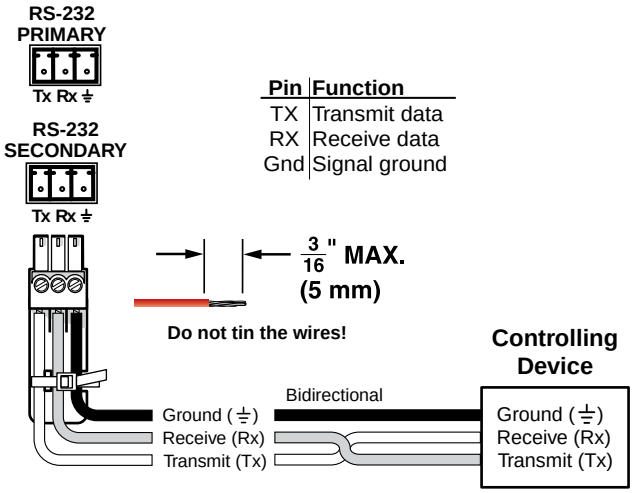
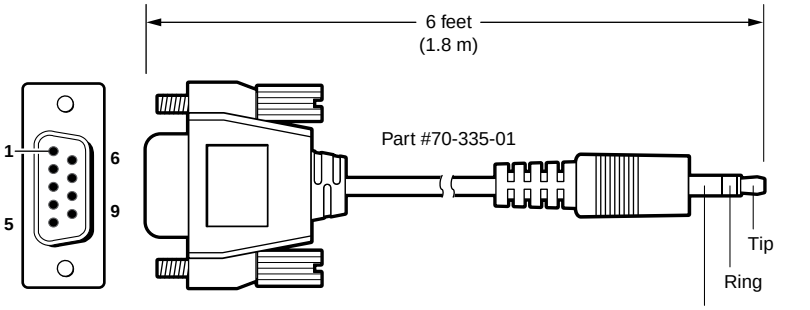


Figure 4-1 — RS-232 connector pin assignments

Front panel Configuration port

NOTE *This port parallels the rear panel RS-232 Secondary port. If a front panel configuration connection is made, the rear panel RS-232 Secondary port becomes inactive and the front panel Configuration port is active. The two paralleled ports' protocol can be changed via SIS command control only. See the "Set serial port parameters" command in "Command/response table for IP-specific SIS commands" on page 4-20 to configure this port under SIS control.*

The optional 9-pin D to 2.5 mm mini jack TRS RS-232 cable, part **#70-335-01** (figure 4-2) can be used for connection to the Configuration port.



9-pin D	Connection	TRS Plug
Pin 2	Computer's RX line	Tip
Pin 3	Computer's TX line	Ring
Pin 5	Computer's signal ground	Sleeve

Figure 4-2 — Optional 9-pin TRS RS-232 cable

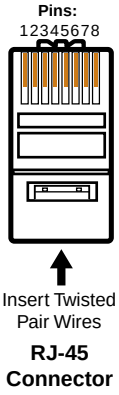
Ethernet (LAN) Port

The rear panel LAN connector on the switcher can be connected to an Ethernet LAN or WAN, making makes SIS control of the switcher possible. Communication between the switcher and the controlling device is via Telnet (a TCP socket using port 23). The Telnet port can be changed, if necessary, via SIS. The SIS commands and behavior of the product are identical to the commands and behavior the product exhibits when you are communicating with it via a serial port.

Ethernet connection

The Ethernet cable can be terminated as a straight-through cable or a crossover cable and must be properly terminated for your application (figure 4-3).

- **Crossover cable —** Direct connection between the computer and the MPX switcher
- **Patch (straight) cable —** Connection of the MPX switcher to an Ethernet LAN



Crossover Cable

Pin	End 1 Wire color	End 2 Wire color
1	White-green	White-orange
2	Green	Orange
3	White-orange	White-green
4	Blue	Blue
5	White-blue	White-blue
6	Orange	Green
7	White-brown	White-brown
8	Brown	Brown
	T568A	T568B

A cable that is wired as T568A at one end and T568B at the other (Tx and Rx pairs reversed) is a "crossover" cable.

Straight-through Cable

Pin	End 1 Wire color	End 2 Wire color
1	White-orange	White-orange
2	Orange	Orange
3	White-green	White-green
4	Blue	Blue
5	White-blue	White-blue
6	Green	Green
7	White-brown	White-brown
8	Brown	Brown
	T568B	T568B

A cable wired the same at both ends is called a "straight-through" cable, because no pin/pair assignments are swapped.

Figure 4-3 — RJ-45 Ethernet connector pin assignments

Default IP parameters

To access the switcher via the Ethernet port, you need the Extron IP address and may need the subnet mask and the gateway address. If the IP address has been changed to an address comprised of words and characters, you can determine the actual numeric IP address using the ping (ICMP) utility (see appendix A, "Ethernet Connection", for more details). If the addresses have not been changed, the factory-specified defaults are:

- IP address 192.168.254.254
- Gateway address 0.0.0.0
- Subnet mask 255.255.0.0
- DHCP off

Establishing a connection

Establish a network connection to an MPX switcher as follows:

1. Open a TCP socket to port 23 using the switcher's IP address.

   NOTE *If the local system administrators have not changed the value, the factory-specified default, 192.168.254.254, is the correct value for this field.*

   The switcher responds with a copyright message including the date, the name of the product, firmware version, part number, and the current date/time.

   NOTE *If the switcher is not password-protected, the device is ready to accept SIS commands immediately after it sends the copyright message.*

   NOTE *If the switcher is password-protected, a* `password` *prompt appears below the copyright message.*

2. If the switcher is password protected, enter the appropriate administrator or user password.

   If the password is accepted, the switcher responds with *`Login User`* or *`Login Administrator`*.

   If the password is not accepted, the *`Password`* prompt reappears.

Connection timeouts

The Ethernet link times out after a designated period of time of no communications. By default, this timeout value is set to 5 minutes but the value can be changed. See the Configure port timeout commands on page 4-20.

NOTE *Extron recommends leaving the default timeout at 5 minutes and periodically issuing the Query (Q) command to keep the connection active. If there are long idle periods, Extron recommends disconnecting the socket and reopening the connection when another command must be sent.*

Number of connections

An MPX switcher can have up to 200 simultaneous TCP connections, including all HTTP sockets and Telnet connections. When the connection limit is reached, the switcher accepts no new connections until some have been closed. No error message or indication is given that the connection limit has been reached. To maximize performance of an IP-enabled device, the number of connections should stay low and unnecessary open sockets should be closed.

Verbose mode

Telnet connections to an MPX switcher can be used to monitor for changes that occur on the switcher, such as front panel operations and SIS commands from other Telnet sockets or a serial port. For a Telnet session to receive change notices from the switcher, the Telnet session must be in verbose mode 1 or 3. See the "Set verbose mode" command on page 4-20. In verbose mode 1 or 3, the Telnet socket reports changes by sending messages that resemble SIS command responses.

Host-to-Switcher Instructions

The switcher accepts SIS commands through the RS-232 ports and Ethernet port. SIS commands consist of one or more characters per command field. They do not require any special characters to begin or end the command character sequence. Each switcher response to an SIS command ends with a carriage return and a line feed (CR/LF = ↵), which signals the end of the response character string. A string is one or more characters.

Switcher-Initiated Messages

When a local event such as a front panel operation occurs, the switcher responds by sending a message to the host. The switcher-initiated messages are listed below (underlined).

(C) Copyright 2008, Extron Electronics, MPX Plus 866 A, V*x.xx*, 60-796-01, *date, time*]

The switcher initiates the copyright message when it is first powered on or when connection via Internet protocol (IP) is established. "V*x.xx*" is the firmware version number. "68-796-01" is the switcher's part number. "*date/time*" is the date and time of the connection and is only reported when the connection is made via the LAN port.

↵Password:

The switcher initiates the password message immediately after the copyright message when the controlling system is connected using TCP/IP or Telnet and the switcher is password protected. This message means that the switcher requires an administrator or user level password before it will perform the commands entered via this link. The switcher repeats the password message response for every entry other than a valid password until a valid password is entered.

↵Login Administrator↵

— or —

↵Login User↵

The switcher initiates the login message when a correct administrator or user password has been entered. If the user and administrator passwords are the same, the switcher defaults to administrator privileges.

Qik↵

The switcher initiates the Qik message when a front panel switching operation has occurred.

Spr*nn*↵

The switcher initiates the Spr message when a memory preset has been saved from the front panel. "*nn*" is the preset number.

Rpr*nn*↵

The switcher initiates the Rpr message when a memory preset has been recalled from the front panel. "*nn*" is the preset number.

In*nn*•Aud*xx*↵

The switcher initiates the Aud message when a front panel input audio level change has occurred. "*nn*" is the input number, • is a space, and "*xx*" is the dB level.

Out*nn*•Vol*xx*↵

The switcher initiates the Vol message when a front panel output audio volume change has occurred. "*nn*" is the output number, • is a space, and "*xx*" is the volume level.

Typ*nn*•*x*↵
The switcher initiates the Typ message when the video format for a video input is changed from the front panel. "*nn*" is the input number, • is a space, and "*x*" is the format: 1 = composite video, 0 = S-video.

Vmt*nn*•*x*↵
The switcher initiates the Vmt message when a video output mute is toggled on or off from the front panel. "*nn*" is the output number, • is a space, and "*x*" is the mute status: 1 = on, 0 = off.

Amt*nn*•*x*↵
The switcher initiates the Amt message when an audio output mute is toggled on or off from the front panel. "*nn*" is the output number, • is a space, and "*x*" is the mute status: 1 = on, 0 = off.

Exe*n*↵
The switcher initiates the Exe message when executive mode is toggled on or off from the front panel. "*n*" is the *Lock* (executive) mode status: 0, 1, or 2.

Switcher Error Responses

When the switcher receives an SIS command and determines that it is valid, it performs the command and sends a response to the host device. If the switcher is unable to perform the command because the command is invalid or contains invalid parameters, the switcher returns an error response to the host. The error response codes are:

E01 — Invalid input channel number (too large)
E10 — Invalid command
E11 — Invalid preset number
E12 — Invalid output number (too large)
E13 — Invalid value (out of range)
E14 — Illegal command for this configuration
E17 — Timeout (caused only by direct write of global ties presets)
E24 — Privilege violation (Ethernet, Extron software only)

Using the Command/Response Tables

The command/response tables begin on page 4-9. Lower case letters are acceptable in the command field except where indicated for the gain and attenuation commands. The table below shows the hexadecimal equivalent of each ASCII character used in the command/response table.

ASCII to HEX Conversion Table																Esc	1B	CR	ØD	LF	ØA
Space	2Ø	!	21	"	22	#	23	$	24	%	25	&	26	'	27						
(	28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F						
Ø	3Ø	1	31	2	32	3	33	4	34	5	35	6	36	7	37						
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F						
@	4Ø	A	41	B	42	C	43	D	44	E	45	F	46	G	47						
H	48	I	49	J	4A	K	4B	L	4C	M	4D	N	4E	O	4F						
P	5Ø	Q	51	R	52	S	53	T	54	U	55	V	56	W	57						
X	58	Y	59	Z	5A	[	5B	\	5C	]	5D	^	5E	_	5F						
`	6Ø	a	61	b	62	c	63	d	64	e	65	f	66	g	67						
h	68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F						
p	7Ø	q	71	r	72	s	73	t	74	u	75	v	76	w	77						
x	78	y	79	z	7A	{	7B	|	7C	}	7D	~	7E	DEL	7F						

Symbols are used throughout the table to represent variables in the command/response fields. Command and response examples are shown throughout the table.

Symbol definitions for basic SIS commands

↵ = CR/LF (carriage return/line feed) (hex 0D 0A)

← = Carriage return (no line feed, hex 0D) (for URL-encoded commands, use the pipe character, **|**, instead)

• = Space character

| = Pipe (vertical bar) character

* = Asterisk character (which is a command character, not a variable)

Esc = Escape key (hex 1B) (use **W** instead of **Esc** for Web browsers)

X1 = Input number (for tie)
00 = untied
01 – 08 = the computer video group
09 – 14 = the low resolution video group

X2 = Output number
01 – 12 for video
01 – 06 for audio

NOTE *A video input from either of the two groups cannot be tied to an output in the other group. Audio can be tied to any output, regardless of the video group to which it was input.*

X3 = Input number
01 – 08 for the computer video group
09 – 14 for the low resolution video group

X4 = Input signal format
1 = composite video
2 = S-video

X5 = Mute, pre-peaking, *Lock* mode, power supply
0 = off/mode 0/not OK
1 = on/mode 1/OK
2 = mode 2

X6 = Volume adjustment range
0 – 64 (1 dB/step except for 0-to-1, which is 34.5 dB)
(see the table on page 4-11)

X7 = Audio gain
0 – 24 (1 dB/step)

X8 = Numeric dB value
-18 to +24 (45 steps of gain or attenuation)

X9 = Audio attenuation
1 – 18 (1 dB/step)

X10 = Preset #
32 maximum (0 = current configuration)

X11 = Name (for presets, inputs, and outputs)
12 characters maximum
Upper- and lower-case alphanumeric characters and
_ : = / and space are valid.

NOTE *The following characters are invalid in the name: ~ , @ ‘ [ ] { } < > ’ “ ; | \ and ?.*

X12 = Video/audio mute:

0 = no mutes	4 = audio right (AR) mute
1 = video mute	5 = video and AR mute
2 = audio left (AL) mute	6 = AL and AR (all audio) mute
3 = video and AL mute	7 = video, AL, and AR (all audio) mute

X13 = Sync frequency
xxx.xx (frequency in Hz (V) or kHz (H))

X14 = Signal detection
0 = no input detected, 1 = input detected

X15 = RGB delay interval
Delay in ½ second increments (10 maximum)

X16 = Firmware version number to second decimal place (*x.xx*)

X17 = Verbose firmware version-description-upload date/time. See page 4-18.

X18 = Voltage
Positive or negative voltage and magnitude

X19 = Temperature
Degrees Fahrenheit

X20 = Group master group number
01 - 32 (repeated as **X64** in appendix B,"DSP SIS Commands")

Command/response table for basic SIS commands

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Create ties			
NOTE • *Video ties cannot be made between the computer video group and the low resolution video group.* • *Program audio ties can be made only to the computer/audio output group (outputs 1 through 6).* • *Mixing audio inputs into the output audio using SIS commands requires a complex command. See appendix B, "Command/Response table for DSP SIS commands".* • *Video and audio ties between the low resolution video input group and the low resolution video outputs group are **always** made with the program audio redirected. In such an operation, the switcher automatically ties the audio to an output in the computer/audio outputs group (outputs 1 through 6) as follows:* ○ *If the video is tied to output 7, the audio is tied to output 1.* ○ *If the video is tied to output 8, the audio is tied to output 2.* ○ *If the video is tied to output 9, the audio is tied to output 3.* ○ *If the video is tied to output 10, the audio is tied to output 4.* ○ *If the video is tied to output 11, the audio is tied to output 5.* ○ *If the video is tied to output 12, the audio is tied to output 6.* • *Commands can be entered back-to-back in a string, with no spaces. For example: 1*1!02*2&02*04%4*6$.* • *The quick multiple tie and tie input to all output commands activate all I/O switches simultaneously.* • *The matrix switchers support 1-, 2-, and 3-digit numeric entries (1*1, 02*02, or 003*003).*			
NOTE *The & **tie** command for RGB and the % **tie** command for video can be used interchangeably on the matrix switcher, but you cannot switch between groups. The switcher returns an X13 error if you try.*			
NOTE *The & **view tie** command for RGB and the % **view tie** command for video can be used interchangeably on the matrix switcher.*			
Tie input X1 to output X2, video and audio	X1*X2!	Out X2 •In X1 •All ↵ *(within computer video group)* — or — Qik ↵ *(within low resolution video group [because of automatic audio redirect switching])*	Tie input X2 's video and audio to output X3.
Example:	1*3!	Out03•In01•All ↵	Tie input 1 video and audio to output 3.
Example:	11*9!	Qik ↵	Tie input 11 video to output 9 and input 11 audio to output 5.
Tie input X1 to output X2, computer video only	X1*X2&	Out X2 •In X1 •RGB ↵	Audio breakaway switching.
Example (see 2nd note, above)	5*4&	Out04•In05•RGB ↵	Tie input 5 RGB to output 4.
Tie input X1 to output X2, video only	X1*X2%	Out X2 •In X1 •Vid ↵	Audio breakaway switching.
Example (see 2nd note, above)	9*7%	Out07•In09•Vid ↵	Tie input 9 video to output 7.
Tie input X1 to output X2, audio only	X1*X2$	Out X2 •In X1 •Aud ↵	Audio breakaway switching.
Example:	12*4$	Out04•In12•Aud ↵	Tie input 12 audio to output 4.
Quick multiple tie	Esc +Q X1 *X2 !...X1 *X2 $ ←	Qik ↵	
Example:	Esc +Q3*4!3*5%3*6$ ←	Qik ↵	Tie input 3 video and audio to output 4, tie input 3 video to output 5, and tie input 3 audio to output 6.

NOTE

X1 = Input number
00 = untied
01 – 08 = the computer video group
09 – 14 = the low resolution video group

X2 = Output number
01 – 12 for video
01 – 06 for audio

Command/response table for basic SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Create ties (continued)			
Tie input to all outputs, video and audio	X1*!	InX1•All↵	
Example:	5*!	In05•All↵	Tie input 5 video and audio to all computer video group outputs.
Tie input to all outputs, RGBHV only	X1*&	InX1•RGB↵	Audio breakaway switching.
Example (see 2nd note on page 4-9)	8*&	In08•RGB↵	Tie input 8 video to all computer video group outputs.
Tie input to all outputs, video only	X1*%	InX1•Vid↵	Audio breakaway switching.
Example (see 2nd note on page 4-9)	10*%	In10•Vid↵	Tie input 10 video to all low resolution video group outputs.
Tie input to all outputs, audio only	X1*$	InX1•Aud↵	Audio breakaway switching.
Read RGB output tie	X2&	X1↵	RGBHV input X1 tied to output X2.
Read video output tie	X2%	X1↵	Video input X1 tied to output X2.
Read audio output tie	X2$	X1↵	Audio input X1 tied to output X2.
Set input format			
Set input video format	X1*X24\	TypX1*X24↵	Set the video format to X4 for input X1. 1 = composite video 2 = S-video
NOTE *The only valid input (X1) numbers are 11 through 14.*			
Example:	11*1\	Typ11*1↵	Set input 11 to composite video.
Read input format	X1\	X24↵	Show the video format of input X1.
Video mute commands			
RGB/video mute	X2*1B	VmtX2*1↵	Mute output X2 RGB (video off).
RGB/video unmute	X2*0B	VmtX2*0↵	Unmute output X2 RGB (video on).
View RGB/video mute	X2B	X5↵	1 = mute on, 0 = mute off.
Global RGB/video mute	1*B	Vmt1↵	Mute all RGB outputs.
Global RGB/video unmute	0*B	Vmt0↵	Unmute all RGB outputs.

NOTE

X1 = Input number	00 = untied 01 – 08 = the computer video group 09 – 14 = the low resolution video group
X2 = Output number	01 – 12 for video 01 – 06 for audio
X3 = Input number	11 – 14 for configurable inputs
X4 = Input signal format	1 = composite video 2 = S-video
X5 = Mute	0 = off (unmuted) 1 = on (muted)

Command/response table for basic SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Audio output volume			
NOTE • *Individual controls, offering finer trim adjustments (in 0.1 dB increments) for the right and left channels and group master offsets are present in the DSP and available through software control (see "DSP Configurator Program", in chapter 5, "Switcher Software"). The results of these controls are not shown in the responses below.* • *The table below the commands defines the value of each audio volume step.*			
Set the audio volume to a specific value	X2*X6V	OutX2•VolX6↵	
Example:	1*50v	Out01•Vol50↵	Set output 1 volume to 79%.
Increment volume	X2+V	OutX2•VolX6↵	Increase volume by 1 step.
Example:	1+V	Out01•Vol51↵	
Decrement volume	X2-V	OutX2•VolX6↵	Decrease volume by 1 step.
View output volume	X2V	X6↵	

X6 value	dB of attenuation	Output volume	X6 value	dB of attenuation	Output volume	X6 value	dB of attenuation	Output volume
00	100	0%						
01	63	5.5%	23	41	38.5%	45	19	71.5%
02	62	7%	24	40	40%	46	18	73%
03	61	8.5%	25	39	41.5%	47	17	74.5%
04	60	10%	26	38	43%	48	16	76%
05	59	11.5%	27	37	44.5%	49	15	77.5%
06	58	13%	28	36	46%	50	14	79%
07	57	14.5%	29	35	47.5%	51	13	80.5%
08	56	16%	30	34	49%	52	12	82%
09	55	17.5%	31	33	50.5%	53	11	83.5%
10	54	19%	32	32	52%	54	10	85%
11	53	20.5%	33	31	53.5%	55	9	86.5%
12	52	22%	34	30	55%	56	8	88%
13	51	23.5%	35	29	56.5%	57	7	89.5%
14	50	25%	36	28	58%	58	6	91%
15	49	26.5%	37	27	59.5%	59	5	92.5%
16	48	28%	38	26	61%	60	4	94%
17	47	29.5%	39	25	62.5%	61	3	95.5%
18	46	31%	40	24	64%	62	2	97%
19	45	32.5%	41	23	65.5%	63	1	98.5%
20	44	34%	42	22	67%	64	0	100%
21	43	35.5%	43	21	68.5%			
22	42	37%	44	20	70%			

NOTE X2 = Output number 01 – 06
X6 = Audio attenuation 00 – 64 (1 dB/step except for 0-to-1, which is 36 dB)

Command/response table for basic SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Audio input gain and attenuation			
NOTE • *The set gain (G) and attenuation (g) commands are case sensitive. The increment, decrement, and read level commands are not case sensitive.*			
• *Individual controls, offering finer trim adjustments (in 0.1 dB increments) for the right and left channels and group master offsets are present in the DSP and available through software control (see "DSP Configurator Program", in chapter 5, "Switcher Software"). The results of these controls are not shown in the responses below.*			
Set input audio gain to + dB value	X3*X7G	InX3•AudX8↵	
Example:	1*2G	In01•Aud+02↵	Set input 1 audio gain to +2 dB.
Set input audio attenuation to - dB value	X3*X9g	InX3•AudX8↵	
Increment level	X3+G	InX3•AudX8↵	Increase audio level by 1 dB.
Example:	6+G	In06•Aud+03↵	Increment audio input 6 level from +2 dB to +3 dB.
Decrement level	X3-G	InX3•AudX8↵	Decrease audio level by 1 dB.
Example:	7-G	In07•-09↵	Decrement audio input 7 level from -08 dB to -9 dB.
Read input audio level	X3G	X8↵	
Audio mute			
Audio mute	X2*1Z	AmtX2*1↵	Mute audio output X2 (audio off).
Audio unmute	X2*0Z	AmtX2*0↵	Unmute audio output X2 (audio on).
Read audio mute	X2Z	X5↵	1 = mute on, 0 = mute off.
Global audio mute	1*Z	Amt1↵	Mute all audio outputs.
Global audio ummute	0*Z	Amt0↵	Unmute all audio outputs.

NOTE

X2 = Output number	01 – 06 for audio
X3 = Input number	01 – 14
X5 = Mute	0 = off (unmuted) 1 = on (muted)
X7 = Audio gain	0 – 24 (1 dB/step)
X8 = Numeric dB value	–18 to +24 (45 steps of gain or attenuation) (Default = 0 dB)
X9 = Audio attenuation	1 – 18 (1 dB/step

Command/response table for basic SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Save, directly write, name, and recall presets			
NOTE • *If the user tries to recall a preset that is not saved, the matrix switcher responds with the error code E11.* • *The following characters are invalid in preset names: + ~ , @ = ‘ [ ] { } < > ’ “ ; : | \ and ?.*			
Save the current configuration as a global ties preset	X10,	Spr X10 ↵	Command character is a comma.
Example:	9,	Spr09↵	Save current ties as preset 9.
Direct write process —			
NOTE *The* direct write of a global ties preset *command should always be preceded by a* clear global ties preset *command of that same preset number, as shown below. In a directly-written preset, each output position's tied input (or no tied output) remains unchanged unless overwritten or cleared.* *If you do not* ***clear*** *a global ties preset number before you* **directly write** *a global ties preset to that number, ties that are part of the previous version of the specified preset can unexpectedly become part of the newly-created preset.*			
Clear a global ties preset	Esc+X10P0*!←	Spr X10 ↵	Clear all ties in preset X10.
Directly write a global ties preset	Esc+X10P X1*X2! X1*X2% X1*X2$ ... X1*X2& ←	Spr X10 ↵	Enter as many ties as are valid for this model. The tie all (!), tie RGBHV (&), tie video (%), and tie audio ($) commands are all valid.
Example:	Esc+27P0*!←	Spr27↵	
	Esc+27P2*5! 10*2$ 13*11% 3*6& ←	Spr27↵	Brackets are shown to separate ties for clarity only. Create global ties preset 27, which ties video and audio input 2 to output 5, audio input 10 to output 2, video input 13 to output 11, and video input 3 to output 6.
Recall a global or partial preset	X10.	Rpr X10 ↵	Command character is a period.
Example:	5.	Rpr X10 ↵	Recall preset 5, which becomes the current configuration.
Write preset name	Esc X10,X11 NG←	Nmg X10,X11 ↵	
Example:	Esc 1,Security 1NG←	Nmg01,Security 1↵	Name preset 1 “Security 1”.
Read preset name	Esc X10 NG←	X11 ↵	
Example:	Esc 2NG←	Security 2↵	

NOTE

X1 = Input number		00 – 14 (00 = untied)
X2 = Output number		01 – 12 for video 01 – 06 for audio
X10 = Preset #		32 maximum (0 = current configuration)
X11 = Name		12 characters maximum

Command/response table for basic SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
View ties, gain, volume, mutes, presets, file status, DSVP, and input status			
Read RGB output tie	X2&	X1↵	RGBHV input X1 tied to output X2.
Read video output tie	X2%	X1↵	Video input X1 tied to output X2.
Read audio output tie	X2$	X1↵	Audio input X1 tied to output X2.
Read input audio level	X3G	X8↵	
Example:	4G	-02↵	Gain for input 4 is -2 dB.
View output volume	X2V	X6↵	
Example:	7V	55↵	Volume for output 7 is 55 steps (9 dB of attenuation, 86.5% of total volume).
Read input video format	X3\	X4↵	Show the video format of input X3.
NOTE *The only valid input (X2) numbers are 11 through 14.*			
View output mutes	Esc VM←	X12[1] X12[2] X12[3] ... X12[12]↵	Each X12 response is the mute status of an output, starting from output 1.
Example:	Esc VM←	Mut0 2 3 0 1 0 0 0 0 0 0 0↵	Output 2 audio left is muted, output 3 video and the left audio channel are muted, and output 5 video and the right audio channel are muted. All other outputs are unmuted.
NOTE *The "Mut" portion of the response appears only when the switcher is in Verbose mode 2 or 3. See the Verbose mode command on page 4-20.*			

NOTE

X1 = Input number for tie	00 – 14 (00 = untied)	
X2 = Output number	01 – 12 for video 01 – 06 for audio	
X3 = Input number	01 – 14	
X4 = Input signal format	1 = composite video 2 = S-video	
X6 = Volume adjustment range	00 – 64 (1 dB/step except for 0-to-1, which is 13 dB)	
X8 = Numeric dB value	-18 to +24 (Default = 0 dB)	
X12 = Video/audio mutes	0 = no mutes 1 = video mute 2 = audio left (AL) mute 3 = video and AL mute	4 = audio right (AR) mute 5 = video and AR mute 6 = AL and AR mute 7 = video, AL, and AR mute

Command/response table for basic SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
View ties, gain, volume, mutes, presets, file status, DSVP, and input status (continued)			
View video preset configuration	Esc X10 *1*1VC ←	X1[1] • X1[2] • X1[3] • ... • X1[16] • Vid ↵	Show preset X10's video configuration. Show the video input tied to 12 sequential outputs, starting from output 1. (Video outputs 13 through 16 are not present on this switcher model.)
Command description:	Preset# * starting output# (StO# ["1" for this switcher]) * 1(=video) VC		
Response description:	Input# (I#) tied to output# (O#)1 • I# tied to O#2 • I# tied to O#3 • ... • I# tied to O#16 • Vid ↵		
Example:	Esc 4*1*1VC ←		

Input 4 tied to output 3 — No tied input

Response = tied input: 08 • 08 • 04 • 08 • 08 • 00 • 09 • 00 • 10 • 10 • 10 • 10 • -- • -- • -- • -- • Vid ↵

Output: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16

Computer/Audio Group | Video Group | Outputs not present

Each position shown in the response is an output: left = starting, right = output 12 (outputs 13 through 16 are not present on this switcher model). The number in each position is the input tied to that output.

Video — Input 8 is tied to outputs 1, 2, 4, and 5; input 4 to output 3; input 9 to output 7; and input 10 to outputs 10 through 12. No input is tied to outputs 6 and 8.

NOTE *If you enter* Esc X10 *1*1VC ← *where* X10 *= 0, the switcher returns its current video configuration.*

View audio preset configuration	Esc X10 *1*2VC ←	X1[1] • X1[2] • X1[3] • ... • X1[16] • Aud ↵	Show preset X10's audio configuration. Show the audio input tied to 6 sequential outputs, starting from output 1. (Audio outputs 7 through 16 are not present on this switcher model.)
Command description:	Preset# * starting output# (StO# ["1" for this switcher]) * 2(=audio) VC		
Response description:	I# tied to O#1 • I# tied to O#2 • I# tied to O#3 • I# tied to O#4 ... • I# tied to O#16 • Aud ↵		
Example:	Esc 4*1*2VC ←		

Input 6 tied to output 3 — Input 12 tied to output 6

Response = tied input: 02 • 04 • 06 • 08 • 10 • 12 • -- • -- • -- • -- • -- • -- • -- • -- • -- • -- • Aud ↵

Output: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16

Computer/Audio Group | Outputs not present

Each position shown in the response is an output: left = starting, right = output 6 (outputs 7 through 16 are not present on this switcher model). The number in each position is the input tied to that output.

Audio — Input 2 is tied to output 1, input 4 is tied to output 2, input 6 is tied to output 3, input 8 is tied to output 4, input 10 is tied to output 5, and input 12 is tied to output 6.

NOTE *If you enter* Esc X10 *1*2VC ← *where* X10 *= 0, the switcher returns its current audio configuration.*

NOTE

X1 = Input number	00 or 01 – 14
X10 = Preset #	32 maximum (0 = current configuration)

Command/response table for basic SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
View ties, gain, volume, mutes, presets, file status, DSVP, and input status (continued)			
NOTE *The response to the* View file directory *command differs, depending on whether the command is sent via an RS-232 or Telnet connection or sent via a Web browser connection.*			
View file directory RS-232 and Telnet	Esc DF←	*filename1,date/time,length*↵ *filename2,date/time,length*↵ *filename3,date/time,length*↵ • • • • *filenamen,date/time,length*↵ *space_remaining* Bytes•Left↵↵	List user-supplied files.
View file directory Web browser	Esc DF←	Var file = new array (); File [1] = '*filename1,date1,filesize1*', File [2] = '*filename2,date3,filesize2*', File [3] = '*filename3,date3,filesize3*', • • • • File [*n*] = '*filenamen,daten,filesizen*', File [*n+1*] = *space_remaining* Bytes•Left↵↵	List user-supplied files.
Erase user-supplied Web pages/files	Esc *filename* EF←	Del*filename*↵	
List individual sync frequency (*Computer video input group, inputs 1 through 8 only*)	X3 LS	X13,X13↵	Listed as horizontal frequency, vertical frequency.
Example:	2LS	031.50,060.00↵	Input 2 horizontal frequency is 31.5 kHz and its vertical frequency is 60 Hz.
NOTE *The matrix switcher returns 000.00,000.00 if there is no connection or sync frequencies are not applicable.*			
List input signal status for all video inputs	0LS	X14[1] X14[2] X14[3] ... X14[14]↵	Each X14 value is an input.
RGB delay (ties to outputs in the computer video group only)			
Set RGB delay	Esc X2*X15 D←	Out X2 •Dly X15↵	
Example:	Esc 4*7D←	Out04•Dly07↵	Set the RGB interval for ties to output 4 to 3.5 seconds (7 x 0.5).
Read RGB delay	Esc X2 D←	X15↵	
Example:	Esc 5D←	05↵	Output 5 switching interval is 2.5 seconds (5 x 0.5).

NOTE

X2 = Output number	01 – 12 for video 01 – 06 for audio
X3 = Input number	01 – 14
X13 = Sync frequency	*xxx.xx* (frequency in Hz (V) or kHz (H))
X14 = Signal detection	0 = no input detected, 1 = input detected
X15 = RGB delay interval	Delay in ½ second increments (10 maximum)

Command/response table for basic SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Names			
Write preset name	Esc X10,X11NG←	Nmg X10,X11↵	
Example:	Esc 1,Security 1NG←	Nmg01,Security 1↵	Name preset 1 "Security 1".
Read preset name	Esc X10NG←	X11↵	
Example:	Esc 2NG←	Security 2↵	
Write input name	Esc X3,X11NI←	Nmi X3,X11↵	
Example:	Esc 9,Podium cam1NI←	Nmi09,Podium cam↵	Name input 9 "Podium cam".
Read input name	Esc X3NI←	X11↵	
Write output name	Esc X2,X11NO←	Nmo X2,X11↵	
Example:	Esc 1,Main PJ1NO←	Nmo01,Main PJ1↵	Name output 1 "Main PJ1".
Read output name	Esc X2NO←	X11↵	
***Lock* (executive) modes**			
NOTE *See "Setting the front panel locks (*Executive *modes)" in chapter 3, "Operation", for more information on* Lock *modes.*			
Lock all front panel functions	1X	Exe1↵	Enable *Lock* mode 1.
Lock advanced front panel functions	2X	Exe2↵	Enable *Lock* mode 2.
Unlock all front panel functions	0X	Exe0↵	Enable *Lock* mode 0.
View lock status	X	X5↵	
Resets			
Reset presets and names	Esc ZG←	Zpg↵	Clear all presets and their names.
Reset an individual preset	Esc X10ZG←	Zpg X10↵	Clear preset X10.
Reset RGB delays	Esc ZD←	Zpd↵	Reset all RGB delays to 0.0 seconds.
Reset audio input levels	Esc ZA←	Zpa↵	Reset all audio input levels (gain and attenuation) to 0 dB.
Reset audio output levels	Esc ZV←	Zpv↵	Reset all audio output levels (volume) to 100% (no attenuation).
Reset all mutes	Esc ZZ←	Zpz↵	Reset all video and audio mutes.
Reset a group	Esc Z X20GRPM←	GrpmZ X20↵	Delete all members from group X20, reset parameters and soft limits.
NOTE *See "Group masters", in chapter 5, "Switcher Software", for more information about audio group masters.*			
Reset flash	Esc ZFFF↵	Zpf↵	Reset flash memory (erase user-supplied files).
Reset whole switcher	Esc ZXXX←	Zpx↵	Clear all ties and presets, resets all audio gains to 0 dB, and resets the volume to 100%.
Absolute reset	Esc ZQQQ←	Zpq↵	Similar to **Reset whole switcher**, plus sets the IP address to 192.168.254.254 and the subnet mask to 255.255.0.0.

NOTE

X3 = Input number	01 – 14		
X2 = Output number	01 – 12 for video	01 – 06 for audio	
X5 = Lock mode	0 = mode 0	1 = mode 1	2 = mode 2
X10 = Preset #	32 maximum (0 = current configuration)		
X11 = Name	12 characters maximum		
X20 = Group master group number	01 – 32		

Command/response table for basic SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Information requests			
Information request	I	V14X12•A14X12↵	This matrix switcher has 14 video and 14 audio inputs by 12 video and 12 audio outputs.
Request part number	N	60-796-01	The MPX part number is 68-796-01.
NOTE *There are up to three separate sets of Extron firmware that the switcher can report on: the MPX controller firmware, which is the overall control firmware; the Ethernet protocol firmware, which handles the Ethernet interface; and the latest optional Extron firmware update, which is available at www.Extron.com.*			
Query controller firmware version	Q	X16↵	
Example:	Q	1.23↵	The factory-installed MPX controller firmware version is 1.23 (sample value only).
Query software version (verbose)	0Q	X16-X17-X17↵	Provide a detailed status of the Ethernet protocol firmware, the MPX controller firmware, and any firmware upgrade. The firmware that is running is marked by an asterisk (*). A caret (^) indicates that the firmware has a bad checksum or an invalid load. ?.?? indicates that the firmware is not loaded.
Response description: Ethernet protocol firmware version - controller firmware version - updated firmware version↵			
Example:	0Q		
Description; * indicates the version running; Upload date and time			
Response: 1.23-0.14(0.20-MPX866D Series -Wed, 16 Jan 2003 00:00:00 GMT)-0.25*(0.24-MPX866D Series -Mon, 08 Sep 2008 14:48:30			
Ethernet protocol firmware; MPX firmware version; Updated firmware version			
Request system status	S	X18•X18•X18•X18•X18•X19↵	
Response description:		+3.3V•+5V•-5V•+2.5V•-15V•+15V•Temp↵	
Example:	S	-15V power system at -15.15V	
		3.29•5.04•-5.14•15.27•-15.15•120.20↵	
		3.3V power system at 3.29V; Temperature 120.20 degrees	

NOTE
X16 = Firmware version number to second decimal place (x.xx)
X17 = Verbose firmware version-description-upload date/time
X18 = Voltage — Positive or negative voltage and magnitude
X19 = Temperature — Degrees Fahrenheit

Symbol definitions for IP SIS commands

X30	= Matrix name	(Up to 240 characters)
NOTE	*The following characters are invalid in the name: {space} ~ , @ = ` [ ] { } < > ‘ “ ; : \ | and ?.*	
X31	= Default name	Factory default name (model name + last 3 pairs of MAC address)
X32	= Time and date (set)	In the format: MM/DD/YY•HH:MM:SS *where*: MM = month: 01 (January) through 12 (December) DD = day: 01 through 31 YY = year: 00 through 99 HH = hour: 00 through 24 MM = minutes: 00 through 59 SS = seconds: 00 through 59
X33	= Time and date (read)	In the format: Day,•DD•Mmm•YYYY•HH:MM:SS *where* Day = weekday: Mon through Sun DD = day: 01 through 31 Mmm = month: Jan through Dec YYYY = year: 2000 through 2099 HH = hour: 00 through 24 MM = minutes: 00 through 59 SS = seconds: 00 through 59
X34	= GMT offset	-12.0 through +14.0 (hours and minutes removed from GMT)
X35	= Daylight Savings Time	0 = Daylight Savings Time off/ignore 1 = Daylight Savings Time on (northern hemisphere) 2 = Daylight Savings Time on (Europe) 3 = Daylight Savings Time on (Brazil)
X36	= IP address	###.###.###.###
X37	= Hardware (MAC) address	##-##-##-##-##-##
X38	= Number of open connections	0 - 255
X39	= Password	12 alphanumeric characters
NOTE	*The following characters are invalid in passwords: {space} ~ , @ = ` [ ] { } < > ‘ “ ; : \ | and ?.*	
X40	= Domain name	Standard domain name conventions apply (for example, *xxx.com*)
NOTE	*The following characters are invalid in passwords: {space} ~ , = ` [ ] { } < > ‘ “ ; : \ | and ?* *The @ character is only acceptable as the lead-in to the domain name (such as* @extron.com*).*	
X46	= DHCP	0 = off, 1 = on
X47	= Port #	01 = rear panel RS-232 Primary port 02 = rear panel RS-232 Secondary port/front panel Cofiguration port
NOTE	*The rear panel RS-232 Secondary port (X47 = 02) is active only if the front panel Configuration port is not in use. If a front panel configuration connection is made, the rear panel RS-232 Secondary port becomes inactive and the front panel Configuration port is active.*	
X48	= Baud rate	9600, 19200, 38400, 115200
X49	= Parity	**O**dd, **e**ven, **n**one, **m**ark, **s**pace (only first letter required)
X50	= Data bits	7, 8
X51	= Stop bits	1, 2
X52	= Port type	0 = RS-232 1 = RS-422
X53	= Verbose mode	0 = Clear/none (default for Telnet connection 1 = Verbose mode (default for RS-232 connection) 2 = Tagged responses for queries 3 = Verbose mode and tagged for queries
NOTE	*If tagged responses is enabled, all read commands return the constant string and the value as the set command does (for example, the read matrix name command, Esc CN←, returns IPN•X30←).*	
X54	= Security level	00 = Anonymous 10 = Extended security levels 1 through 10 11 = User 12 = Administrator
X55	= RAM status	0 = RAM dirty (needs saving to flash) 1 = RAM has been saved (ok to power off / reset)
X56	= Port timeout interval (in 10-sec. increments)	1 (= 10 seconds) – 65000 (default is 30 = 300 seconds = 5 minutes)

Command/response table for IP SIS commands

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Set matrix name (location)	Esc X30 CN ←	Ipn•X30 ↵	
Read matrix name (location)	Esc CN ←	X30 ↵	
Reset matrix name to factory default	Esc •CN ←	Ipn•X31 ↵	
Set time and date	Esc X32 CT ←	Ipt X32 ↵	
Read time and date	Esc CT ←	X33 ↵	
Set GMT offset	Esc X34 CZ ←	Ipz X34 ↵	The divider between hours and minutes is a period.
Read GMT offset	Esc CZ ←	X34 ↵	
Set Daylight Savings Time	Esc X35 CX ←	Ipx X35 ↵	Set the switcher to display the local time as Daylight Savings Time (+1 hour) in summer months.
Read Daylight Savings Time	Esc CX ←	X35 ↵	
Set IP address	Esc X36 CI ←	Ipi X36 ↵	
Read IP address	Esc CI ←	X36 ↵	
Read hardware address	Esc CH ←	X37 ↵	
Read # of open connections	Esc CC ←	X38 ↵	
Set subnet mask	Esc X36 CS ←	Ips X36 ↵	
Read subnet mask	Esc CS ←	X36 ↵	
Set gateway IP address	Esc X36 CG ←	Ipg X36 ↵	
Read gateway IP address	Esc CG ←	X36 ↵	
Set administrator password	Esc X39 CA ←	Ipa•X39 ↵	
Read administrator password	Esc CA ←	X39 ↵	
Reset (clear) administrator password	Esc •CA ←	Ipa•X39 ↵	
Set user password	Esc X39 CU ←	Ipu•X39 ↵	
Read user password	Esc CU ←	X39 ↵	
Reset (clear) user password	Esc •CU ←	Ipu•X39 ↵	
Set DHCP on or off	Esc X46 DH ←	Idh X46 ↵	
Read DHCP status	Esc DH ←	X46 ↵	
Set serial port parameters	Esc X47*X48,X49,X50,X51 CP ←	X48,X49,X50,X51 ↵	
Read serial port parameters	Esc X47 CP ←	Cpn X47•Ccp X48,X49,X50,X51 ↵	
Set serial port mode	Esc X47*X52 CY ←	Cpn X47•Cty X52 ↵	
NOTE *All serial ports are limited to the RS-232 protocol only.*			
Read serial port mode	Esc X47 CY ←	X52 ↵	
Set verbose mode	Esc X53 CV ←	Vrb X53 ↵	
Read verbose mode	Esc CV ←	X53 ↵	
Read connection's security level	Esc CK	X54 ↵	
Commit RAM to flash memory	Esc 1FF ←	Nvr X55 ↵	
Check RAM	Esc FF ←	X55 ↵	
Configure current port timeout	Esc 0*Y76 TC ←	Pti0*Y76 ↵	
Read current port timeout	Esc 0TC ←	Y68 ↵	
Configure global IP port timeout	Esc 1*Y76 TC ←	Pti1*Y76 ↵	
Read global IP port timeout	Esc 1TC ←	Y76 ↵	

Special Characters

The HTML language reserves certain characters for specific functions. The switcher will not accept these characters as part of preset names, the switcher's name, passwords, or locally created file names.

The switcher rejects the following characters:
{space (spaces **are** ok for names)} + } ~ , @ = ‘ [ ] { } < > ’ “ semicolon (;) colon (:) | \ and ?.

5

Chapter Five

Switcher Software

Control Software

DSP Configurator Program

Optimizing the Audio

Matrix Switchers Control Program

Special Characters

Button-Label Generator Program

Switcher Software

Control Software

The Windows®-based Extron Digital Signal Processor (DSP) Configurator program and Matrix Switchers Control Program communicate with the switcher via the Ethernet LAN port, either rear panel RS-232 port, and the front panel Configuration (RS-232) port to provide an easy way to set up ties and sets of ties. The DSP Configurator further provides a tool for configuring and controlling all of the advanced MPX Plus DSP audio mixing and other processing functions. The programs are compatible with Windows 2000, Windows XP, and later. Updates to these programs can be downloaded from the Extron Web site (www.extron.com).

Installing the software

The programs are contained on the Extron Software Products Disk. Install the software as follows:

NOTE *For full functionality, install all of the following programs:*

- *DSP Configurator*
- *Matrix Switchers Control Program*
- *Firmware Loader*

1. Insert the disk into the drive. The installation program should start automatically. If it does not self-start, run Launch.exe from the disk.

   The Extron software disk window appears (figure 5-1).

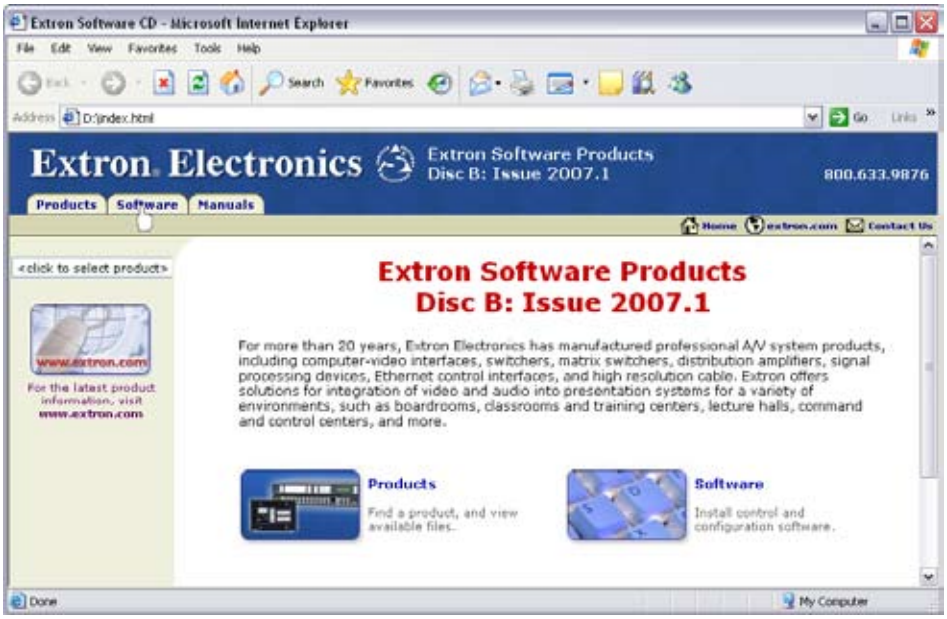

Extron Software CD - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address D:\index.html
Extron Electronics
Extron Software Products
Disc B: Issue 2007.1
800.633.9876
Products
Software
Manuals
Home
extron.com
Contact Us
«click to select product»
www.extron.com
For the latest product information, visit www.extron.com
Extron Software Products
Disc B: Issue 2007.1
For more than 20 years, Extron Electronics has manufactured professional A/V system products, including computer-video interfaces, switchers, matrix switchers, distribution amplifiers, signal processing devices, Ethernet control interfaces, and high resolution cable. Extron offers solutions for integration of video and audio into presentation systems for a variety of environments, such as boardrooms, classrooms and training centers, lecture halls, command and control centers, and more.
Products
Find a product, and view available files.
Software
Install control and configuration software.
Done
My Computer

Figure 5-1 — Software disk window

2. Click the **Software** tab (figure 5-1).
3. Scroll to the desired program and click **Install** (figure 5-2).

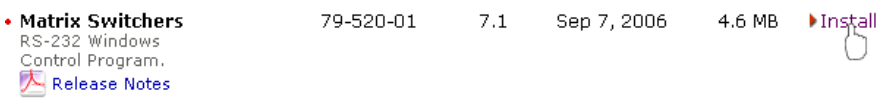


Figure 5-2 — Software installation

4. Follow the on-screen instructions.

   By default, the installation of the DSP Configurator program creates a C:\Program Files\Extron\DSP_Configurator directory, and it places the following four icons into a group folder named "Extron Electronics\DSP Configurator":

   - DSP Configurator
   - DSP Configurator Help
   - Uninstall DSP Configurator
   - Check for DSP Configurator Updates

   By default, the installation of the Matrix Switchers Control Program creates a C:\Program Files\Extron\Matrix_Switchers directory, and it places the following four icons into a group folder named "Extron Electronics\Matrix Switchers":

   - MATRIX Switcher+ Control Program
   - MATRIX Switcher+ Help
   - Uninstall MATRIX Switcher
   - Check for Matrix Updates

Software operation via serial port

The MPX Plus switcher can support remote control via either rear panel RS-232 port or the front panel Configuration port. The program can operate at 9600, 19200, 38400, or 115200 baud rates for either port. See "Selecting the RS-232 Primary port's baud rate" in chapter 3, "Operation", to configure the rear panel Remote RS-232 Primary port from the front panel. See the Serial port configuration commands on page 4-20 to configure any of the serial ports using an SIS command.

Software operation via Ethernet

When a matrix switcher is connected to an Ethernet WAN or LAN, up to 200 users can operate it, locally or remotely, using the DSP Configurator or the Matrix Switchers Control Program. See "Ethernet connection", in chapter 2, "Installation", for installation details.

Connection to the switcher via the Ethernet for the Matrix Switchers Control Program may be password protected. There are two levels of password protection: administrator and user. Administrators have full access to all switching capabilities and editing functions. Users can select inputs and outputs, set and recall presets, and view all settings with the exception of passwords. If the same password or no password is required for logging on, all personnel log on with administrator privileges. Fields and functions that exceed user privileges are blocked in the applicable programs when the operator is logged on as a user.

Ethernet protocol settings

The IP Settings/Options screen of the Matrix Switchers Control Program (figure 5-26 on page 5-44) provides a location for viewing and, if connected via the RS-232 link or if logged on via the Ethernet port as an administrator, editing settings unique to the Ethernet interface. See "IP Settings/Options window" later in this chapter for more details.

DSP Configurator Program

Starting the program

NOTE *Extron recommends connection via the Ethernet LAN port for the DSP Configurator program.*

To run the DSP Configurator Program, click **Start** > **Programs** > **Extron Electronics** > **DSP Configurator** > **DSP Configurator**. The DSP Configurator program starts in *Emulate* mode (figure 5-3, on the next page).

Using the program

In the DSP Configurator window in *Emulate* mode, you can tailor a variety of audio parameters and then transfer them to the MPX by going to *Live* mode (connected to an MPX). You can also switch to *Live* mode and then tailor the audio settings in real time, while listening to the audio output with a critical ear. See "*Emulate* mode vs. *Live* mode", later in this chapter.

NOTE *There are three possible DSP Configurator displays:*

- *Audio and video I/O page (figure 5-3)*
- *Audio-only I/O page*
- *Video-only I/O page*

The DSP Configurator program always starts in the audio and video I/O page, as shown in figure 5-3. Three additional control blocks are availalable in the video-only I/O page. See "Video-only I/O page controls", later in this chapter.

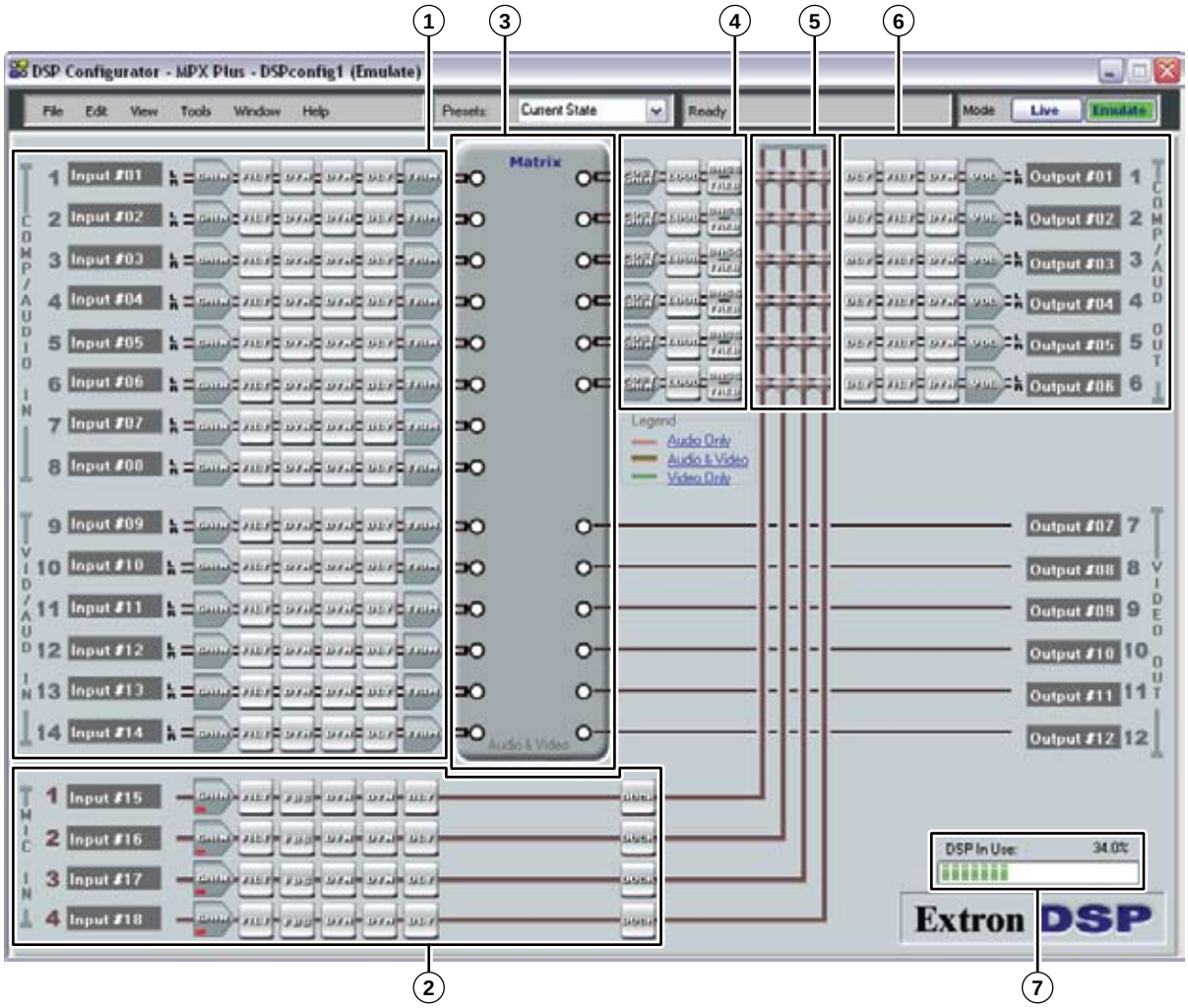


Figure 5-3 — DSP Configurator program window

The DSP Configurator program window consists of a number of signal processor chains, an A/V matrix block, and a mic mixer block.

1. Program audio input (computer/audio group and video/audio group) signal processor chains
2. Mic/line input signal processor chain
3. A/V matrix block
4. Output signal processor chain (pre mic mixer)
5. Mic mixer block
6. Output signal processor chain (post mic mixer)
7. DSP usage meter. See "DSP capacity and design rule verification", on page 5-30.

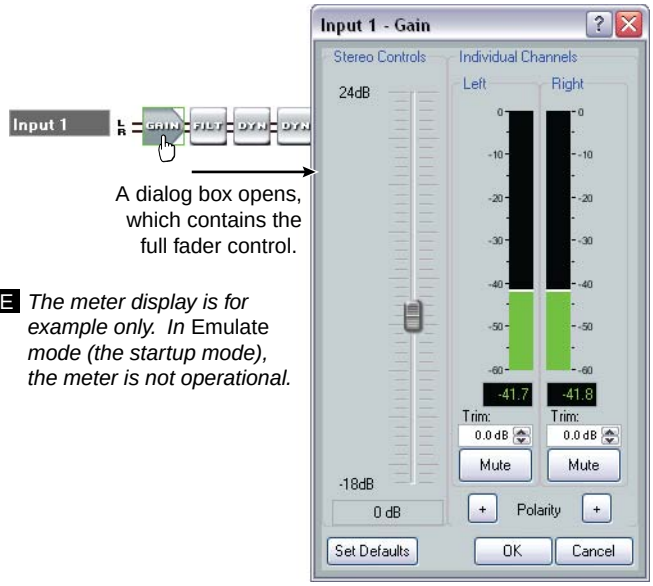
NOTE *The usage meter is shown partially filled for reference only. On startup, it is at 0%.*

Audio signal processor chains and control blocks

Each of the four signal processing chains (①, ②, ④, and ⑥) consists of a series of control blocks of two basic types that are specific to that chain: gain, trim, post-gain, and volume control blocks (collectively known as "gain blocks" –) and processor blocks ( ). For example, the computer audio input 1 chain consists of a gain fader, a filter block, two dynamic blocks, a delay block, and a trim fader. Gain controls are always present (active) in the signal processor chain. Processor blocks, while always shown in the program window, must be individually activated ("inserted") as shown in figure 5-5.

Many gain blocks can be muted and process block controls can be bypassed. Mutes and bypasses are shown by red indicator(s) in the block.

Gain blocks — The parameters set by the gain blocks are always present in the signal chain. To access the actual fader control to view a value, make a change, or observe a live audio meter (Gain and Trim blocks only), double-click the gain block icon (figure 5-4). This action opens a dialog box, a new window that contains the fader for that control.



NOTE *The meter display is for example only. In* Emulate *mode (the startup mode), the meter is not operational.*

Figure 5-4 — Accessing a typical gain control dialog box

Processor blocks — Each processor block control represents a menu of one or more possible processes (such as filters) that can be inserted into the audio stream. For blocks that provide more than one processor, only one processor can be selected. Each block can be inserted by a double-click or right-click >Insert and selecting the desired processor (figure 5-5). Once a block is inserted, the selected processor is displayed in the block and the block itself changes color.

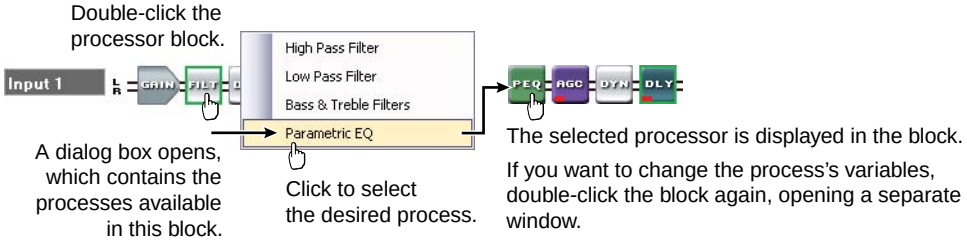

Double-click the processor block.
Input 1
GAIN
FILT
High Pass Filter
Low Pass Filter
Bass & Treble Filters
Parametric EQ
PEQ
AGC
DYN
DLY
A dialog box opens, which contains the processes available in this block.
Click to select the desired process.
The selected processor is displayed in the block.
If you want to change the process's variables, double-click the block again, opening a separate window.

Figure 5-5 — Selecting a typical processor block dialog box

Each processor has a set of associated parameters that define that processor (such as a frequency curve); those parameters can be accessed and changed by double-clicking again on the now inserted process block. This action opens a customizable dialog box, a new window that contains parameters for the process (figure 5-6).

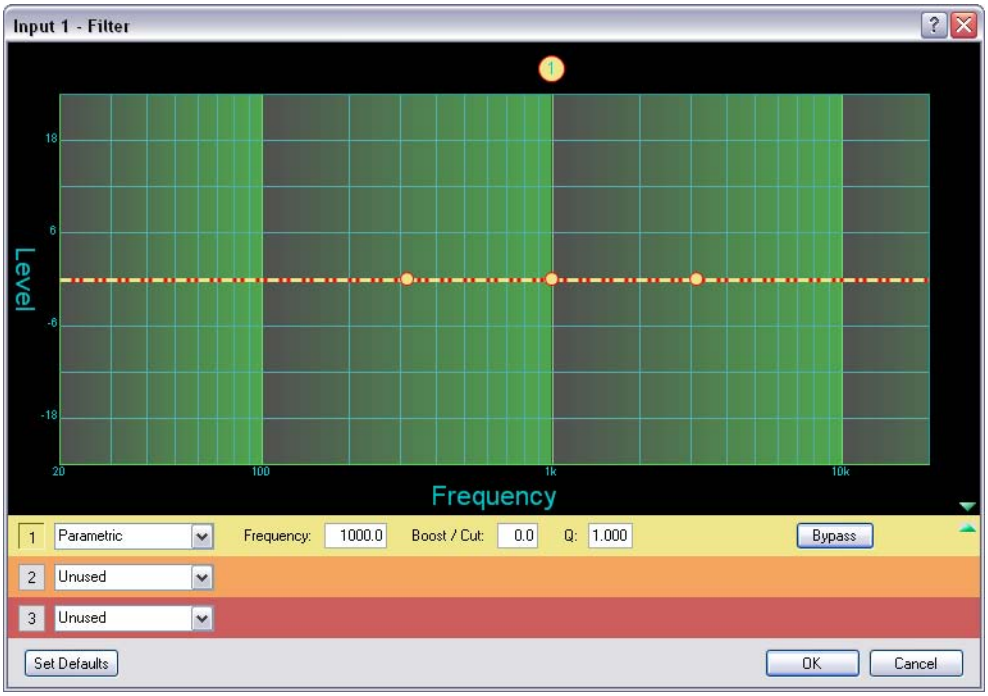


Figure 5-6 — Sample processor dialog box

- The **Set Defaults** button lets you discard all custom settings and reload the factory defaults.

- The **Bypass** button lets you temporarily suspend the processor without removing the processor block.

By default, each processor block is automatically bypassed when inserted (the **Bypass** button in the processor dialog box is selected), although this can be changed for each processor block type, see "DSP Configuratotor Tools menu" and the specific tabs for the processor types. When a processor is bypassed, a red indicator in the block turns on.

NOTE *Figure 5-6 is a sample of one type of dialog box. The contents and appearance of each processor are unique to that processor.*

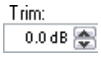
The block can be removed from the audio stream by selecting it and depressing the keyboard Delete key or by right-clicking and selecting **Delete**.

Program audio input signal controls (①)

The program audio input signal processor chain makes adjustments to program audio material before it is tied to specific outputs.

Gain control — The always-present gain control provides the same basic audio input level adjustments that are available from the front panel (see "Viewing and adjusting the input audio level", in chapter 3, "Operation").

Additionally, the left and right input channels each have trim controls, accessible in the dialog box, for separate fine adjustment with a gain range of -6 dB to +6 dB in 0.1 dB increments. The default setting is unity gain (0.0 dB).



NOTE *The trim settings are not indicated in the front panel display.*

The **Polarity** buttons, accessible in the dialog box, let you flip the polarity of the wires connected to the audio connectors (+/tip and -/ring) to easily correct for miswired connectors.

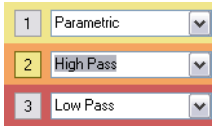
The **Mute** buttons, accessible in the dialog box, let you separately silence the left and right audio channels. If you mute both channels, audio is completely silent on that input. When one or both channels are muted, one or two red indicator(s) in the block turn on.

Filter block — The filter processor block, when first inserted, provides one of four filter selections; additional filters can then be added. A filter attenuates (removes) or boosts a range of frequencies from an audio waveform, while passing other frequencies. Click the desired filter to select it.

NOTE *Selecting "Bass & Treble Filter" inserts two separate filters.*

Additional filters, for a total of up to three filters, can then be added by double-clicking the processor block. Additionally, each filter's frequency range can be changed in the dialog box, customized to the filter, that can be accessed by double-clicking the processor block.

To add a second and/or third filter to the filter block, select the desired filter in the 2 and 3 drop-down boxes in the dialog box.

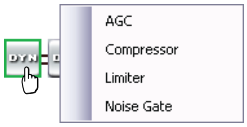


The following filters are available:

- **High pass filter —** A high pass filter passes a band of frequencies extending from a specified cutoff frequency (greater than zero) up toward the high-end of the frequency spectrum. All frequencies above the specified cutoff frequency are allowed to pass, attenuating all frequencies below. The default cutoff is 100 Hz.
- **Low pass filter —** A low pass filter passes a band of frequencies extending from a specified cutoff frequency (less than infinite) down toward the low end of the frequency spectrum. All frequencies below the specified cutoff frequency are allowed to pass, attenuating all frequencies above. The default cutoff is 10 kHz

- **Bass and treble filters —** Also known as shelving or tone filters, the separate bass and treble filters give the ability to cut or boost gain evenly above or below a given frequency, with the end-band shape giving the visual appearance of a shelf. These filters are typically applied to program material, and are expressed as bass and treble control. The bass default frequency is 100 Hz and the treble default is 8 kHz.
- **Parametric equalizer filter —** A parametric equalizer is a variable equalizer that offers control of all parameters, including amplitude (boost/cut — the amount of gain (boost) or gain reduction (cut) that is applied at a given frequency), center frequency (frequency), and bandwidth (Q). This allows the user to control the amplitude of each band, shift the center frequency, and widen or narrow the affected area.

Dynamics blocks (2) — The two dynamics processor blocks, when inserted, each provide one of four dynamic processors. A dynamic processor alters the dynamic range of an audio signal, the difference between the loudest to the quietest portions of the signal above the system's noise floor. Dynamic range can either be increased using an expander (noise gate) or reduced using a compressor. Click the desired dynamics processor to select it or to view a live audio meter as shown at right.



Each processor's parameters can be changed in the dialog box, customized to the processor, that can be accessed by double-clicking the processor block.

- **Automatic gain control (AGC) —** AGC adjusts the gain level based upon the strength of the incoming signal to achieve a more consistent volume. Above a set threshold, weaker signals receive more gain to reach a user-defined target level; stronger signals receive less gain or no gain at all.

  A *window* range is also applied above and below the target level. When the signal reaches the window, gain control starts scaling in a linear fashion toward the target level to achieve smoother results.

  The default threshold is -40 dB. The default target level is -10.0 dB. The default gain and window are 12.0 dB.
- **Compressor —** The compressor regulates the input signal's level by reducing, or compressing, the signal's dynamic range above a specified threshold. The signal's input level to output level ratio determines the reduction in the dynamic range beyond the threshold setting. For example, with a ratio setting of 2:1, for every 2 dB of input the compressor outputs 1 dB of gain.

  Compression is commonly used to keep mic levels within an acceptable range for maximum clarity. A compressor make softer sounds louder either by reducing the dynamic range and then raising the compressor's output level (referred to as "make-up gain"), or by increasing the input signal and then preventing clipping by reducing the louder portions of the signal. This has the effect of making louder portions of a signal softer. Compression also can be used, similar to a limiter, to protect a system or a signal chain from overload.

  The default threshold is -30 dB. The ratio is 2.0:1.
- **Limiter —** The limiter regulates the level of the input signal by severely restricting its dynamic range above a specified threshold. The limiter prevents clipping and protects a system against component or speaker damage. The limiter is closely related to the compressor but applies a much higher compression ratio, in excess of 20:1 (often expressed as ∞:1) and with a high threshold setting (default is -10 dB, close to clipping). The ratio cannot be changed.

- **Noise gate —** The noise gate is an expander, expanding the dynamic range of a signal below a specified threshold. To simplify, it makes soft signals softer, effectively removing background noise while allowing a stronger signal, above the threshold, to pass. Using a high ratio of 20:1, the expander closes the audio path below the threshold, eliminating background noise, opening the path above the threshold to allow signal to pass; hence the term *noise gate*.

  The default threshold is -65 dB. The ratio is 20.0:1.

Delay block — The delay processor block, when inserted, provides a means to delay the audio signal to sync it to video. The processor can delay the audio using either time or distance as a determiner. The default delay, when inserted, is at 100 ms, using the time function. The delay block's settings can be changed in the dialog box that can be accessed by double-clicking the processor block. When you select distance, you can select feet or meters; at which point you can also specify a temperature, in either degrees Fahrenheit or degrees Centigrade. The processor calculates the change in speed of sound for the specified temperature.

Trim control — The always-present trim control provides separate left and right input channel faders for fine adjustment with a gain range of -12 dB to +12 dB in 0.1 dB increments. The default setting is unity gain (0.0 dB).

The **Gang** button lets you couple the left and right faders. Ganged faders move together at relative levels to the top or bottom of their travel. If one fader reaches the limit of its travel first, it retains that position while the other fader continues to travel. When the ganged faders travel in the reverse direction, the fader that was at its limit reverts to its position relative to the other fader.

Mic/line input signal controls (②)

The mic/line input signal processor chain makes adjustments to microphone or line level audio material, such as a speaker's presentation, before it is mixed with program audio.

Gain control — The always-present gain control provides a single long-throw fader with a gain range of 0 dB to +80 dB, adjustable in 1 dB increments, with a level setting readout below the fader.

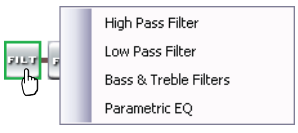
A gain range from 0 to +10 dB accommodates a line level signal, typically from a wireless microphone receiver with a line level output.

Above +10 dB, the input switches to a mic level input.

The **Phantom Power** checkbox, accessible in the dialog box, lets you toggle +48 VDC phantom power on and off, typically to power a condenser mic.

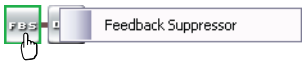
The **Mute** button, accessible in the dialog box, let you silence the mic/line input.

Filter block — The filter processor block, when first inserted, provides one of four filter selections; additional filters can be then be added. The available filters and adding additional filters are identical to as described on the program audio input in the filter processor block (except that up to five filters total can be selected for this block). See "Program audio input signal controls (①)".

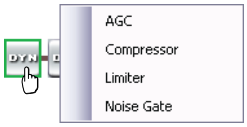


NOTE *Selecting "Bass & Treble Filter" inserts two separate filters.*

Feedback suppressor block — The feedback suppressor processor block, when inserted, detects feedback on a live microphone channel, and uses a set of fixed and dynamic filters to counteract the frequency peaks at the detected feedback frequencies. You may possibly achieve an additional 3 dB to 9 dB of mic gain where feedback would have otherwise prevented these levels.



Dynamics blocks (2) — The two dynamics processor blocks, when inserted, each provide one of four dynamic processors. The available processors are identical to the processors available on the input in the dynamics processor block and described in "Program audio input signal controls (①)".



Delay block — The delay processor block, when inserted, provides a means to delay the audio signal if necessary to sync it to video. The delay processor block is identical to the delay processor available on the input and described in "Program audio input signal controls (①)".

Ducking block — The ducking processor block, when inserted, provides a means to *duck*, or lower the level of, one or more microphones and/or the program material when the processor detects a signal from another source. Ducking lasts for the duration of the interrupting signal (plus hold and release time) and restores the ducked mic's original level once the other signal has ceased. Ducking is useful when:

- Program material needs to be attenuated in order to more clearly hear the narrator's voice.
- One microphone, such as one used by a master of ceremonies, needs to have priority over other mics and/or program material.
- A paging mic needs to attenuate all other signals.

There are three possible settings to insert a Mic/line input as a ducking source:

- **Duck Outputs Only —** Ducks only selected outputs.
- **1st Priority —** Ducks other mics, plus selected outputs.
- **2nd Priority** — Ducks selected outputs, and is ducked by another mic(s).

All four ducking processor blocks are controlled via a common dialog box that opens when you select to configure any of the ducking blocks. When a Ducking processor block is inserted, it is automatically set to the **Duck Outputs Only** in the dialog box (whether the dialog box is opened or not). Conversely, when the Ducking dialog window is open and any mic channel is set to **Duck Outputs Only**, the corresponding processor block in the main DSP Configurator window becomes active.

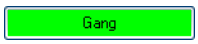
Output signal, pre mic mixer, controls (④)

The output signal processor chain, pre mic mixer, makes adjustments to program audio material, after it is tied to a specific output but before it is mixed with microphone audio.

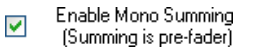
Post Gain control — The always-present post gain control provides separate left and right channel (or separate summed mono channel) faders for fine adjustment of the program material before the mic material is mixed in, with a gain range of -100 dB to +12 dB in 0.1 dB increments. The default setting is unity gain (0.0 dB).

The **Mute** button, accessible in the dialog box, let you silence the mic/line input.

The **Gang** button, accessible in the dialog box, lets you couple the left and right faders. Ganged faders move together at relative levels to the top or bottom of their travel. If one fader reaches the limit of its travel first, it retains that position while the other fader continues to travel. When the ganged faders travel in the reverse direction, the fader that was at its limit reverts to its position relative to the other fader.



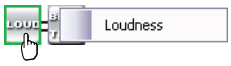
The **Enable Mono Summing** checkbox, accessible in the dialog box, provides the control to insert a stereo-to-mono summing amplifier if desired. The summing amp creates dual mono audio paths whose levels can be controlled individually. When a summing amp is inserted, the appearance of the Post Gain control changes to Mono Sum, as shown at right.



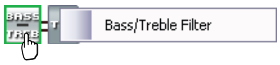
NOTE *Summing increases the overall level by 6 dB.*

NOTE *The summing amplifer function occurs* before *the Post Gain control; any adjustments made in the control to summed audio are made to both mono audio paths.*

Loudness block — The loudness processor block, when inserted, applies a filter compensation curve to the signal in an inverse relationship to the the post gain control setting and output volume control setting; the higher the post-gain or output volume setting, the less compensation is applied. For the relationship to the Post-gain control, the left and right trims are represented by separate curves in the Loudness dialog. You can fine-tune the loudness compensation; see "Optimizing the Audio", later in this chapter.



Bass and treble block — The bass/treble processor block, when first inserted, applies separate bass and treble filters. If you open the associated Bass/Treble dialog box, you can then replace these filters. The bass and treble filters (and the other available filters) and selecting different filters are identical to as described on the program audio input in the filter processor block (except that only two filters total can be selected for this block). See "Program audio input signal controls (①)".



NOTE *Selecting "Bass /Treble Filter" inserts two separate filters.*

NOTE *If you select different filters for this block, the name of the block changes to "Filt", as shown at right.*

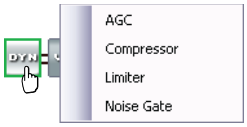
Output signal, post mic mixer, controls (⑥)

The output signal processor chain, post mic mixer, makes adjustments to mixed program and microphone audio, before it is output to the selected speakers or other audio devices.

Delay block — The delay processor block, when inserted, provides a means to delay the audio signal to compensate for speaker placement in the situations where some speakers that are delivering the same signal are much farther away than others. The delay processor block is identical to the delay processor available on the input and described in "Program audio input signal controls (①)". Delay the closer speakers so that delivery time matches the farther speakers.

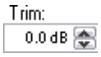
Filter block — The filter processor block, when first inserted, provides one of four filter selections; additional filters can be then be added. The available filters and adding additional filters are identical to as described on the program audio input in the filter processor block (except that up to nine filters total can be selected for this block). See "Program audio input signal controls (①)".

NOTE *Selecting "Bass & Treble Filter" inserts two separate filters.*



Dynamics blocks — The dynamics processor block, when inserted, provides one of four dynamics processors. The available processors are identical to the processors available on the input in the dynamics processor block and described in "Program audio input signal controls (①)".

Volume control — The always-present volume control provides the same basic audio output level adjustments that are available from the front panel (see "Viewing and adjusting the output volume", in chapter 3, "Operation").



Additionally, the left and right output channels each have trim controls, accessible in the dialog box, for separate fine adjustment with a gain range of -6 dB to +6 dB in 0.1 dB increments. The default setting is unity gain (0.0 dB).

NOTE *The trim settings are not indicated in the front panel volume display.*

The **Polarity** buttons, accessible in the dialog box, let you flip the polarity of the wires connected to the audio connectors (+/tip and -/ring) to easily correct for miswired connectors.

The **Mute** button, accessible in the dialog box, lets you silence the audio output. This control is identical to the audio mute control available from the front panel. When the audio output is muted, red indicators in the block turn on.

A/V matrix block (③)

The A/V matrix block (figure 5-7) displays the current tie configuration of either the program's own emulation or the connected matrix switcher and provides a way to make or break ties.

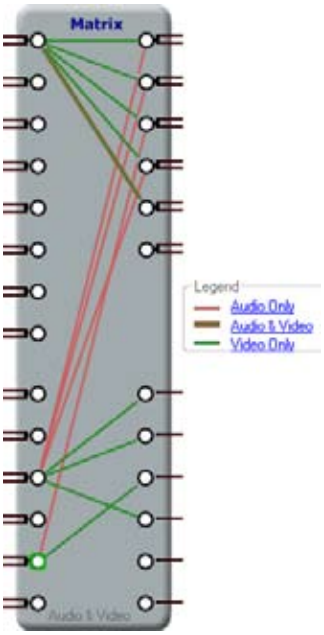


Figure 5-7 — A/V matrix block

- To create a tie, drag a line from an input node (○) to one or more output nodes or right-click an input node and select **Connect To All Outputs**.
- To remove a tie, click an input or output node and depress the keyboard Delete key or right-click an input or output node and select **Delete All Connections** (input node) or **Delete Connection** (output node). The Legend field identifies the type of tie: video and audio, audio only, or video only.

NOTE *Video and audio ties between the low resolution video input group and the low resolution video output group are **always** made with the audio redirected. In such an operation, the switcher automatically ties the audio to an output in the computer video/audio outputs group (outputs 1 through 6) as follows:*

- *If the video is tied to output 7, the audio is tied to output 1.*
- *If the video is tied to output 8, the audio is tied to output 2.*
- *If the video is tied to output 9, the audio is tied to output 3.*
- *If the video is tied to output 10, the audio is tied to output 4.*
- *If the video is tied to output 11, the audio is tied to output 5.*
- *If the video is tied to output 12, the audio is tied to output 6.*

- To set up audio in follow mode (audio and video have the same tie configuration), click **Audio & Video** in the Legend field or **View** > **Audio & Video I/O** on the task bar.
- To set up audio in breakaway mode (audio and video have different tie configurations), click **Video Only** or **Audio Only** in the legend field, or **View** > **Audio I/O** or **View** > **Video I/O** on the task bar.

Mic mixer block (⑤)

The mic mixer block (figure 5-8), an array of points where mic audio can be mixed into the output audio, provides a way to unmute and mute the normally muted inputs from the mic/line input signal processor chain. Unmuting effectively mixes the mic inputs into the audio outputs at the level set in the left and right mix controls.

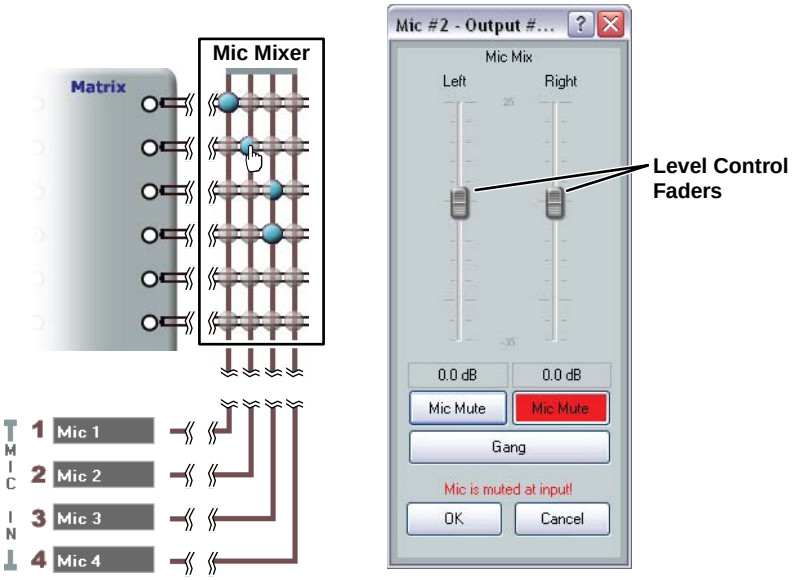


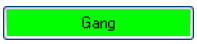
Figure 5-8 — Mic mixer block and mic mixing dialog box

- To mute or unmute a mic, double-click one of the mix-points (▬) to open a mic mixing dialog box. Click the left and/or right **Mic Mute** buttons in the dialog box to unmute or mute the applicable mic/line input into the left and/or right output channel. The appearance of the mix-point indicates the mic/line input connection status as follows:
  - ▬ Muted
  - ● Mixed into both (left and right) output channels
  - ◐ Mixed into the left output channel only
  - ◑ Mixed into the right output channel only

NOTE *Unlike from line inputs 1 through 14 (typically program audio), more than one mic audio input can be mixed into a single audio output.*

NOTE *Note the message "*`Mic is muted at input!`*" in figure 5-8. This indicates that* **Mute** *is selected in the mic/line input gain control block.*

- The mic mixing dialog box includes level controls that provide separate left and right output channel faders for mix (level) adjustment with a gain range of -35 dB to +25 dB in 1 dB increments. The default setting is unity gain (0 dB).
- The **Gang** button lets you couple the left and right faders. Ganged faders move together at relative levels to the top or bottom of their travel. If one fader reaches the limit of its travel first, it retains that position while the other fader continues to travel. When the ganged faders travel in the reverse direction, the fader that was at its limit reverts to its position relative to the other fader.



Group masters

Any of the gain blocks' gain, volume, and trim fader controls can be grouped with other gain blocks of the same type (in the same location in the audio signal path but for different inputs or outputs) for single-fader control of the entire group (figure 5-9). Mute controls within the blocks can also be grouped (figure 5-10). Up to 32 groups can be created, each can include up to 16 group members.

NOTE *Stereo gain blocks have two, left and right, signal paths; each path counts as a group member, limiting you to up to eight gain blocks total for a control group of stereo gain controls. In figure 5-9, the group 2 master consists of six members*

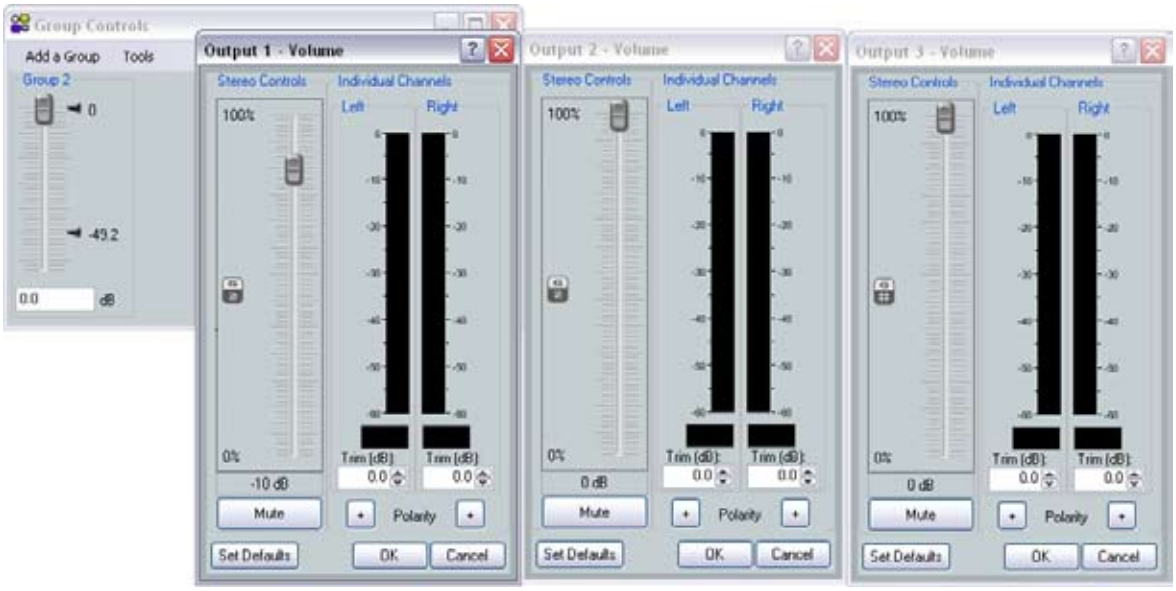


Figure 5-9 — Sample fader group master and associated gain controls

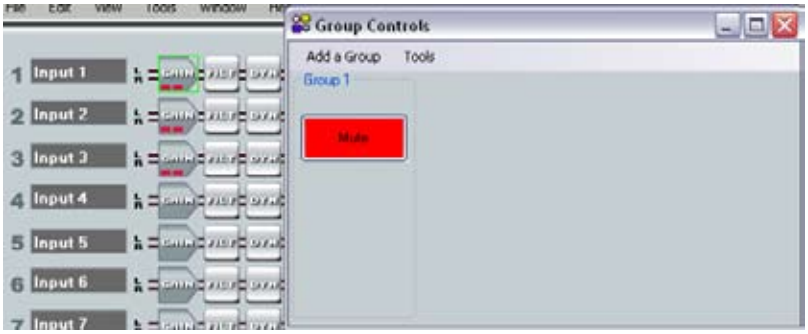


Figure 5-10 — Sample mute group master and muted inputs

Assume that your system has several audio outputs dedicated to a single room. You want all outputs to receive the same audio input, but there are different audio dynamics in different parts of the room: front row audience members need less mic audio mixed in, and you want to insert varying degrees of delay for different rows of the audience. The outputs 1 through 3 volume controls can be grouped into a master (figure 5-9) that controls the volume throughout the room.

Each individual volume control in the group can be set for that output, but when you move the group fader, all three output controls' faders move in tandem, retaining their relative levels.

Soft limits (◄) are adjustable, letting you set the ceiling and floor for the group.

Grouped faders move together at relative levels to the top or bottom of their travel. If one fader reaches the limit of its travel first, it retains that position while the other faders continue to travel. When the grouped faders travel in the reverse direction, the fader that was at its limit reverts to its position relative to the other faders. No gain block's level fader can be set beyond the group fader's upper or lower limits, either the hard limits or the soft limits. Any gain fader in the group can be set to a level below the group fader.

An icon in the gain control indicates that a gain control is assigned to a group; in figure 5-9, indicates group 2. in the output 3 control indicates that that gain control is assigned to more than one group.

NOTE *If a block is muted, that block remains muted when the group mute is released.*

TIP *Extron recommends that if you include a control in multiple groups, that you do so with care; overlapping group membership can quickly become unmanageable.*

Configuring a group master

Configure a group as follows:

1. Click **Tools** > **Configure Groups** to open the Configure Groups dialog box.

NOTE *Or, click* **View** > **Group Controls** *and then click the* **Add a Group** *menu selection.*

2. In the Select Group drop-down box, click a group to select it (figure 5-11).

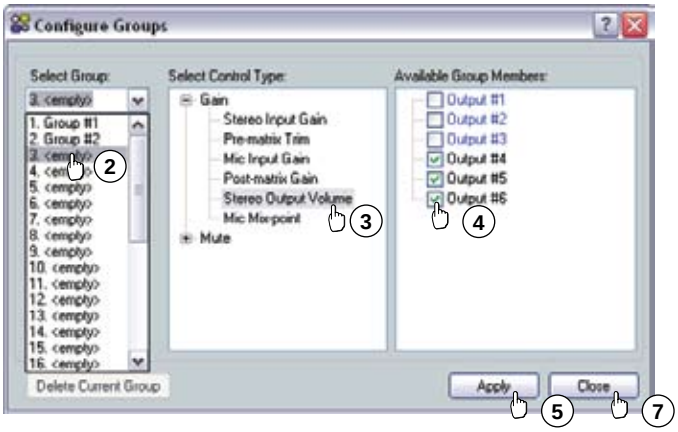


Figure 5-11 — Configure Groups dialog box

NOTE *<empty> groups have no group members assigned. Numbered groups (such as "Group #1") have controls assigned that may be overwritten if you select them and continue.*

3. In the Select Control Type field, click the + to expand the Gain and/or Mute tree and then select a control to assign it to the group.
4. In the Available Group Members field, click the desired checkboxes to select or deselect those blocks as members of the group.

NOTE *Potential group members in step* **4** *that are already assigned to a different group are displayed in* ***blue****.*

5. Click the **Apply** button to create or configure the group.
6. **If desired**, repeat steps **2** through **5** to create or configure other groups.
7. Click the **Close** button to exit the Configure Groups dialog box.

Deleting a group master

Delete a group as follows:

1. Click **Tools** > **Configure Groups** to open the Configure Groups dialog box.

NOTE *Or, click* **View** > **Group Controls** *and then click the* **Add a Group** *menu selection.*

2. In the Select Group drop-down box, click a numbered group (such as "Group #1") to select it (figure 5-11).
3. Click **Delete Current Group**.
4. Click **Yes** in the Confirm Deletion dialog box.

Viewing and using a group master

Click **View** > **Group Controls** to open the Group Controls dialog box (figure 5-12).

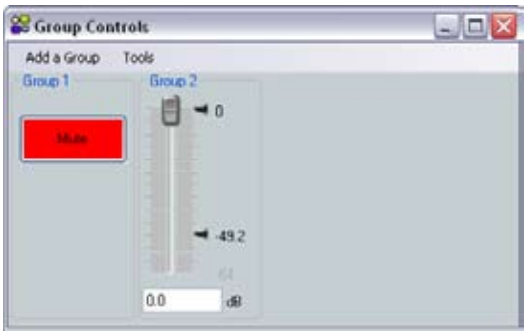


Figure 5-12 — Group Controls dialog box

- Slide a group fader up and down to adjust all gain controls in the group.
- Click and drag a soft limit (➡) to set the ceiling or floor for the group.

NOTE *The soft limits cannot be dragged beyond the current setting of the group fader; the ceiling cannot be set below the fader and the floor cannot be set above the fader.*

NOTE *None of the individual gain faders can be dragged below the floor or above the ceiling of the group's soft limits.*

- Click and drag a soft limit (➡) to set the ceiling or floor for the group.
- Click the **Mute** button in a mute group to mute or unmute all blocks in the group.

NOTE *If a block is muted, that block remains muted when the group mute is released.*

- Click **Add a Group** to open the Configure Groups dialog box. See "*Configuring a group master*" and figure 5-11.
- Click **Tools** > **Clear All Groups** to delete all groups.

- Click **Tools** > **Increment/Decrement Simulator** to open a dialog box (figure 5-13) that lets you experiment with fine adjustments.

Figure 5-13 — Increment/Decrement Simulator dialog box

NOTE
- *You must select a group before the other controls in the dialog box are active.*
- *The size of the increment can be changed from its default value of 1 dB by typing a value in the Increment Value or Decrement Value field, to as fine as 0.1 dB.*

- Click **Tools** > **Group Details Report** to create a Microsoft Word file that details all created groups (figure 5-14).

GROUP DETAILS REPORT

Group #1
Processor Type: Mute
Current Value: 1
Current Group Members:
Output #7 Left Channel
Output #8 Right Channel
Output #9 Left Channel
Output #10 Right Channel
Output #11 Left Channel
Output #12 Right Channel

Group #2
Processor Type: Gain
Current Value: -10.8
Current Group Members:
Output #1 Left Channel
Output #2 Right Channel
Output #3 Left Channel
Output #4 Right Channel
Output #5 Left Channel
Output #6 Right Channel

Figure 5-14 — Sample group details report

Video-only I/O page controls

Three video control blocks are available only on the video-only I/O page (figure 5-15), selected by clicking **Video Only** in the legend field, clicking **View** > **Video I/O**, or pressing the keyboard F4 key.

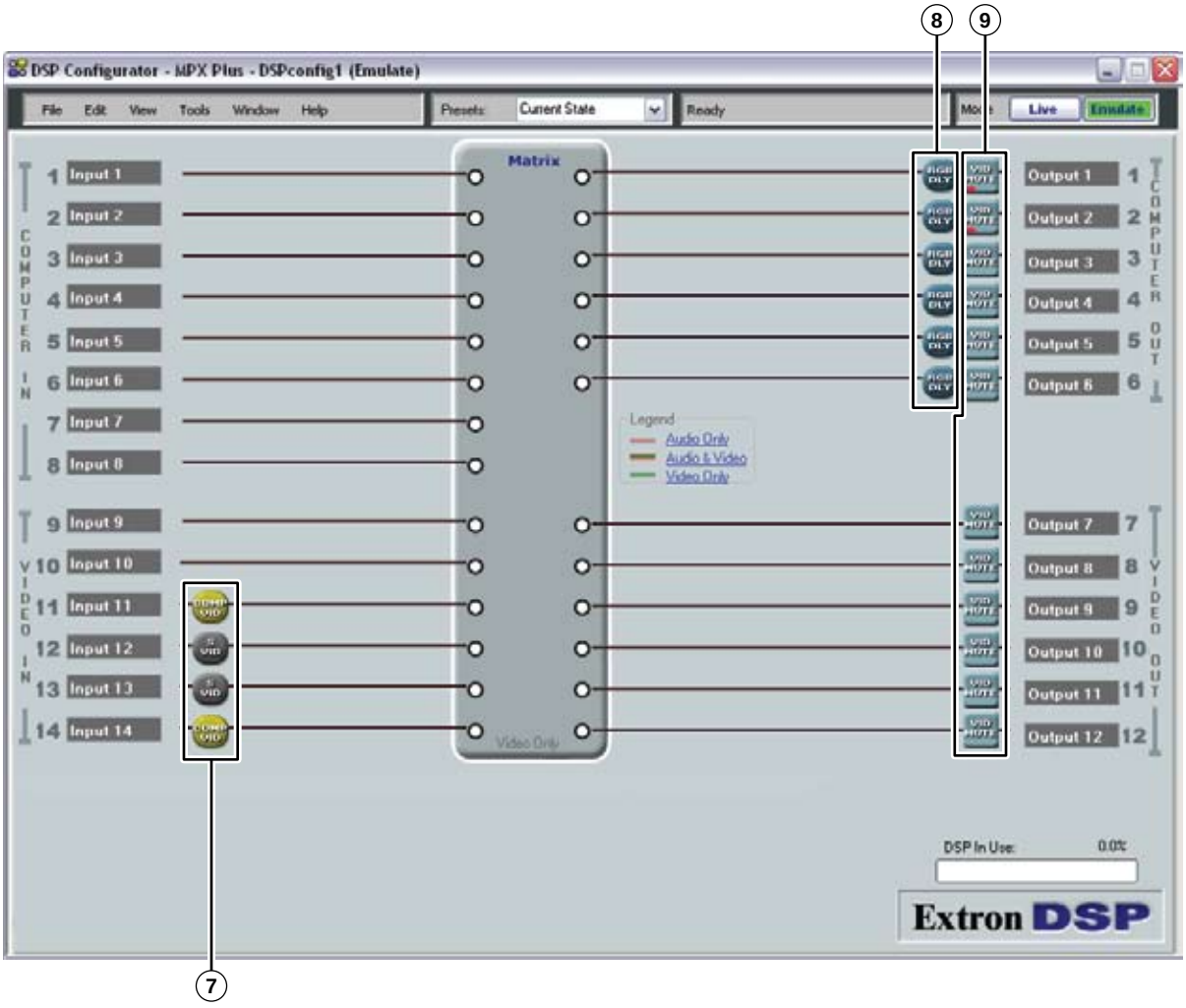
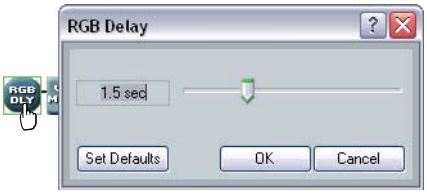


Figure 5-15 — DSP Configurator program window, video-only I/O page

⑦ **S-video/composite video selection block —** Low resolution video inputs 11 through 14 are individually configurable as either S-video or composite video. Double-click this block to toggle between S-video and composite video.

⑧ **RGB Delay block —** The switcher can briefly blank the red, green, and blue planes of a Computer Video (output 1 through 6) output when a tie is made to it. Double-click the RGB Delay block to open a dialog box that allows you to set the RGB Delay from 0.0 to 5.0 seconds in 0.5 second increments.



⑨ **Video Mute block —** Double-click the Video Mute block to toggle the video mute on and off. When video is muted, a red indicator in the block turns on.

NOTE *In the computer video group, the video mute function mutes the R, G, and B planes only; the sync (H and V planes) are still active. In the low resolution video group, the video mute function mutes the composite video plane or both S-video planes.*

Presets

The MPX Plus 866 A can store up to 32 presets. Presets saved via the DSP Configurator program are partial presets, and can include both selected ties and selected audio signal processing settings made in the program. Partial presets, when recalled (by any means), overwrite only a portion of the current configuration, leaving other ties and settings unchanged, and are useful when only selected ties and/or settings, such as for a particular room, need to be changed.

Save a Preset

Before you save a preset using the DSP Configurator program, you must select, or mark, the desired ties and signal processor blocks. Save a preset as follows:

1. Mark the desired video and/or line audio ties as desired:

   a. Click or right-click > **Mark** an output node (○). The node is marked by a green outline (○).

      The output and the tied input are selected to be saved as a preset.

   b. Ctrl-click or right-click > **Mark** additional outputs as desired.

TIP

- *If an input is tied to multiple outputs, and you want the entire set of ties saved as a preset, mark **each** output to save that tie.*
- *To mark multiple successive outputs (marking all outputs selects all ties), mark the uppermost output node as described in step **1a**. Then, Shift-click an output node under it to mark all of the outputs between the two nodes.*

2. Mark the desired mic mix-points:

   a. Click or right-click > **Mark** a mix-point (●). The point is marked by a green outline (●).

      The mic/line input, the mixed output, and all mix settings are selected to be saved as a preset.

   b. Ctrl-click or right-click > **Mark** additional mix-points as desired.

TIP

- *To mark the same mic/line input mix-point for a successive series of outputs, mark the leftmost or rightmost mix-point as described in step **2a**. Then, Shift-click a mix-point to the left or right of it to mark each mix-point in the row (mix the mic/line input to each output).*

- *To mark the same output mix-point for a successive series of mic/line inputs, mark the uppermost mix-point as described in step **2a**. Then, Shift-click a mix-point under it to mark each mix-point in the column (mix the output to each mic/line input).*

3. Mark the desired gain and/or processor blocks:

   a. Click a processor block. The block is marked by a green outline ( ).

      The processor block and all of its settings is selected to be saved as a preset.

   b. Ctrl-click additional processor blocks as desired.

HINT

- *To mark multiple successive processor blocks in a chain, use right-click* > **Mark Row**.

4. Save the preset:

   a. Click **Tools** > **Presets** > **Save Presets**.

      The Save a Preset dialog box appears.

   b. **As desired**, enter a specific preset number

   c. **As desired**, enter a preset name.

NOTE *Unless you enter a specific number and/or name, the DSP Configurator program enters the next sequential unused preset number and the name "Preset {number}.*

   d. Click **OK**.

Recall a Preset

Recall a preset as follows:

1. Select the desired preset in the Presets drop-down menu (figure 5-16).

   The selected preset appears in the Presets window, marked processors appear indicated by green boxes, ties that will be loaded as part of the preset are shown by dashed lines, and ties that will be eliminated by the preset are indicated by the output node highlighted in green.

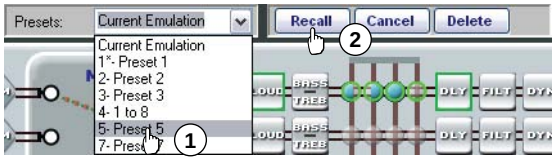


Figure 5-16 — Recalling a preset

NOTE *The* **Recall**, **Cancel**, *and* **Delete** *buttons appear when a preset is selected.*

NOTE *An asterisk in the drop-down list indicates that a partial preset that only exists in the switcher has not been saved to the DSP Configurator's configuration file. The preset's ties and settings are not in sync between the DSP Configurator program and the switcher.*

Presets marked with an asterisk should be recalled and then the current DSP Configurator settings saved. Click **File** > **Save** *or* **File** > **Save As**.

NOTE *It may take up to two seconds for the preset data to read-in in* Live *mode.*

2. Click **Recall** to load and make active the selected preset.

HINT

- *Click* **Cancel** *to abandon the preset recall (but not deleting the preset) and return to the current configuration.*
- *Click* **Delete** *to permanently erase the preset.*

Emulate mode vs. *Live* mode

The DSP Configurator program always starts in *Emulate* mode. In *Emulate* mode, you can perform all of the functions available in the DSP Configurator program, without connecting a switcher to the computer, and save all of the ties and settings to a configuration file on your PC. When you open the file via the DSP Configurator program, the program restores all ties and settings as the current configuration (emulated if in *Emulate* mode or live, in the switcher, if in *Live* mode) and makes presets saved in the file available for recall.

Synchronizing: pull vs. push

When you switch to *Live* mode, after making ties or setting processors in *Emulate* mode, you need to synchronize the switcher and the DSP Configurator program. You are given the opportunity to either:

- ***Pull*** data from the switcher and update the DSP Configurator program's configuration
- ***Push*** data from the DSP Configurator program to the switcher, overwriting ties, settings, and presets in the switcher

You can also switch to *Live* mode and then tailor the audio settings in real time, while listening to the audio output with a critical ear.

Selecting *Live* mode and pulling data

Switch from *Emulate* mode to *Live* mode as follows:

NOTE *Extron recommends connection via the Ethernet LAN port for DSP Configurator.*

1. Click the Mode **Live** button (figure 5-17). The Communication Type Selection windows appears, with either the TCP/IP tab or RS-232 tab active.

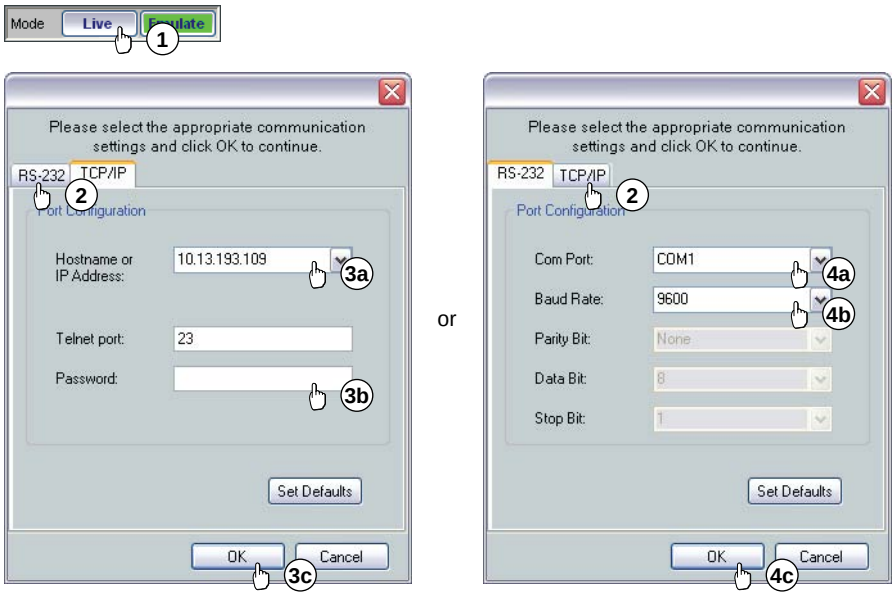


Figure 5-17 — Selecting* Live *mode

2. **If necessary** and as desired, click either the:
   - **TCP/IP tab** (for connection via the LAN port (**preferred**) — proceed to step **3**), **or**
   - **RS-232 tab** (for connection via either of the rear panel RS-232 ports or the front panel Configuration port — proceed to step **4**).

3. **If you selected TCP/IP in step 2**:

   a. Observe the IP Address field in the IP Connection window. The field displays the last IP address entered.

   If the IP Address field is correct, proceed to step **3b**.

   If the address is not correct, either click in the IP Address field and enter the IP address or click on the scroll down button (▾) to open a drop-down list and select from among the recently used addresses. Proceed to step **3b**.

NOTE *If the local system administrators have not changed the value, the factory-specified default, 192.168.254.254, is the correct value for this field.*

   b. If the switcher is password protected, click in the Password field and enter the appropriate administrator password.

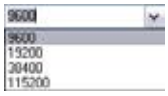
   c. Click **Ok**.

   The Synchronize with Device dialog box (figure 5-18, on page 5-25) appears. Proceed to step **5**.

4. **If you selected RS-232 in step 2**:

   a. Click the Com Port drop-down menu and select the PC's comm port that is connected to the switcher's front panel Configuration port or rear panel RS-232 port.

   b. Check the baud rate displayed in the comm port selection window. If you need to change the baud rate to match the switcher's rate, click the Baud Rate drop-down menu and select the desired baud rate. The default is 9600.



   c. Click **Ok**.

   The Synchronize with Device dialog box appears. Proceed to step **5**.

5. **If necessary** and as desired, click (figure 5-18) either the:

   - **Pull** radio button (to configure the DSP Configurator program to match the switcher — proceed to step **7**)
   - **Push** radio button (to configure the switcher to match the DSP Configurator program — proceed to step **6**)

NOTE *Extron recommends performing a design rule verification before pushing to ensure that the DSP is not overloaded. See "DSP capacity and design rule verification", on page 5-30.*

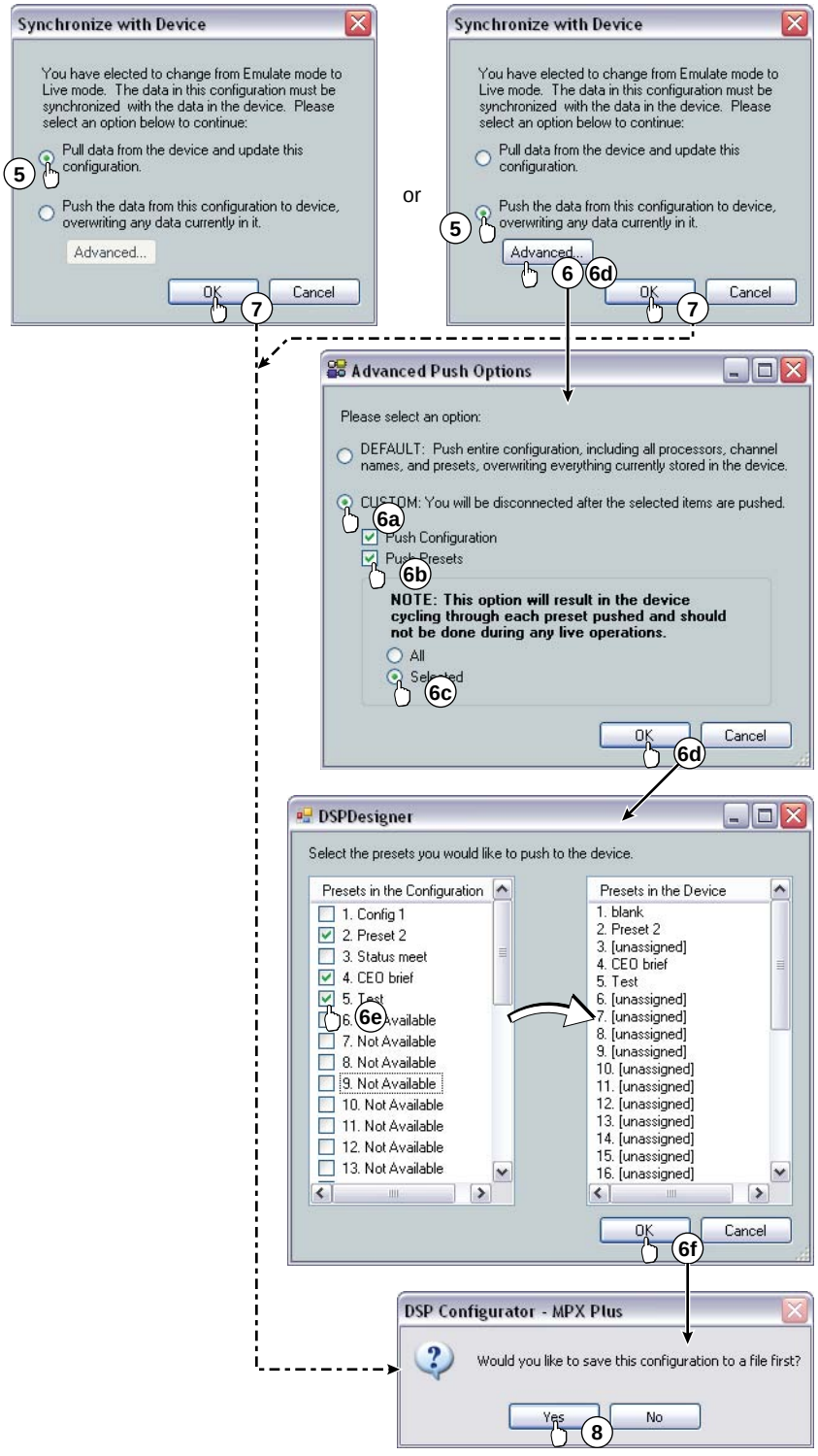

Synchronize with Device
You have elected to change from Emulate mode to Live mode. The data in this configuration must be synchronized with the data in the device. Please select an option below to continue:
Pull data from the device and update this configuration.
Push the data from this configuration to device, overwriting any data currently in it.
Advanced...
OK
Cancel
5
7
or
Synchronize with Device
You have elected to change from Emulate mode to Live mode. The data in this configuration must be synchronized with the data in the device. Please select an option below to continue:
Pull data from the device and update this configuration.
Push the data from this configuration to device, overwriting any data currently in it.
Advanced...
OK
Cancel
5
6
6d
7
Advanced Push Options
Please select an option:
DEFAULT: Push entire configuration, including all processors, channel names, and presets, overwriting everything currently stored in the device.
CUSTOM: You will be disconnected after the selected items are pushed.
Push Configuration
Push Presets
NOTE: This option will result in the device cycling through each preset pushed and should not be done during any live operations.
All
Selected
OK
Cancel
6a
6b
6c
6d
DSPDesigner
Select the presets you would like to push to the device.
Presets in the Configuration
1. Config 1
2. Preset 2
3. Status meet
4. CEO brief
5. Test
6. Not Available
7. Not Available
8. Not Available
9. Not Available
10. Not Available
11. Not Available
12. Not Available
13. Not Available
Presets in the Device
1. blank
2. Preset 2
3. [unassigned]
4. CEO brief
5. Test
6. [unassigned]
7. [unassigned]
8. [unassigned]
9. [unassigned]
10. [unassigned]
11. [unassigned]
12. [unassigned]
13. [unassigned]
14. [unassigned]
15. [unassigned]
16. [unassigned]
OK
Cancel
6e
6f
DSP Configurator - MPX Plus
Would you like to save this configuration to a file first?
Yes
No
8

Figure 5-18 — Selecting* Live *mode, continued

6. If you want to tailor the push to the switcher (push just the configuration, just the presets, or the configuration and selected presets), click the **Advanced** button and proceed to step **6a**.

   To push all of the DSP Configurator ties, gain and processor blocks, and presets to the switcher, proceed to step **7**.

   a. Select the **Custom** radio button.

   b. Select the desired checkbox(es); **Push Configuration** and/or **Push Presets**.

NOTE **Configuration** *includes all ties, mic mixes, and gain and processor blocks. This selection does not include partial presets.*

   c. If you selected **Push Presets** in step **6b**, select either the **All** or **Selected** checkbox.

      If you selected **Selected**, proceed to step **6d**.

      If you selected **All** (equivalent to a standard push), proceed to step **7**.

   d. If you selected **Selected** in step **6c**, the Synchronize with Device dialog box reappears. Click **OK**.

   e. Select the desired partial presets to push by clicking in the appropriate checkbox(es).

   f. Click **OK**. — Proceed to step **8.**

7. Click **OK**. The DSP Configurator program is connected live to the switcher and the ties, processors, and presets are pushed or pulled as selected, completing the selection of *Live* mode.

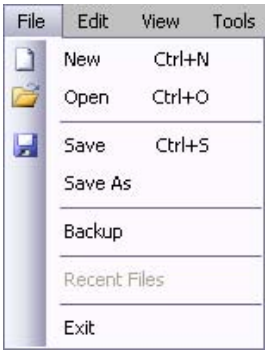
8. If you have created ties or made any changes to the DSP parameters (including gain and/or processor blocks) since the last time you saved to a file, the DSP Configurator prompts you to save the file. Click **Yes** or **No**, as desired,

   If a password was required and not entered or if an incorrect password was entered, the program prompts for the password.

DSP Configurator Windows menus

DSP Configurator File menu

NOTE **New**, **Open**, *and* **Recent Files** *are unavailable in* Live *mode.*



New — Discards the current DSP configuration (after prompting to save any changes) and opens a blank configuration file with no inserted processors, saved partial presets, created ties, or mic mixes.

Open — Loads and activates a previously saved DSP configuration file.

Save — Saves all changes to the current DSP configuration file under the current file name. If the file has not previously been saved the program prompts for a file name.

Save As — Saves all changes to the current DSP configuration file under a new file name.

Backup — Transfers all partial presets plus the current configuration to a DSP configuration file within the DSP Configurator program.

Recent Files — Opens a list of recently opened or saved DSP configuration files, making it easy to select one to open.

Exit — Closes the DSP Configurator Program.

DSP Configurator Edit menu

Cut — Copies all of the parameters of a selected processor block or set of selected blocks to the clipboard and removes the block(s) from the processor stream.

NOTE *Gain blocks are always present and cannot be* **Cut**.

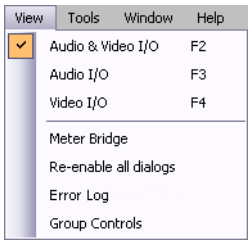
NOTE *Processor blocks are removed from the processor stream after a* **Cut** *and a subsequent* **Paste** *operation.*

NOTE *Processor blocks and their parameters can be pasted only into another block of the same type. For example, the input 1 filter block and all of its parameters can be copied to the input 2 filter block but not to the input 1 delay block.*

Copy — Copies all of the parameters of a selected processor block, gain block, or set of selected blocks to the clipboard.

Paste — Inserts processor blocks and their parameters from the clipboard into the DSP Configurator program at the location selected.

DSP Configurator View menu



Audio & Video I/O — Selects the audio and video I/O page for the DSP Configurator program (the default view).

Audio I/O — Selects the audio-only I/O page for the DSP Configurator program.

Video I/O — Selects the video-only I/O page for the DSP Configurator program.

Meter Bridge — Opens a Meters dialog box (figure 5-19) that gives you a "system at a glance" view of the audio level at each input and output.

NOTE **Meter Bridge** *is available in* Live *mode only and only while connected via the switcher's LAN port.*

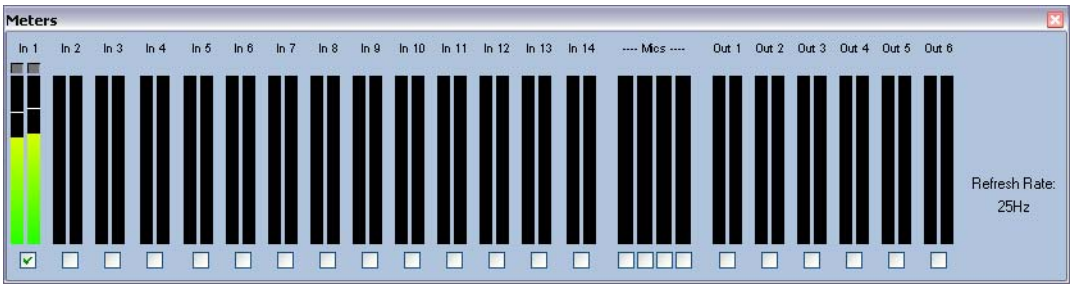


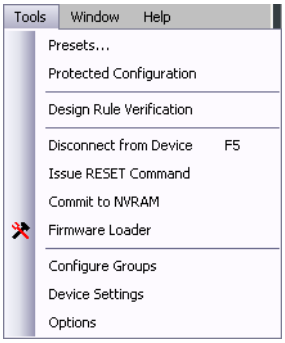
Figure 5-19 — Meter dialog box

Re-enable all dialogs — Re-enables all dialog boxes, the pop-up windows that allow you to make changes to a block's parameters.

Error log — A troubleshooting tool, error log lists error messages.

Group Controls — Opens the the Group Controls dialog box. See "Viewing and using a group master" on page 5-18.

DSP Configurator Tools menu



Presets — Allows you to mark all items, save a preset, and clear marked items:

- **Mark All Items —** Mark (select) all parts of the current configuration (excluding presets), including processors, created ties, and mic mixes to save as a partial preset.
- **Save Preset —** Save the currently marked processors, ties, and mic mixes as a partial preset.
- **Clear Marked Items —** Unmark (deselect) all parts of the current configuration (excluding presets), including processors, created ties, and mic mixes.

Protected Configuration — Allows a user (typically the installer) to save and recall a protected configuration. The protected configuration is useful to establish the MPX Plus 866 A's configuration and all presets, mic mixes, parameters, variables, and values (with the exception of the switcher's IP address) in a known state, either as a troubleshooting tool or as a baseline configuration. The protected configuration, once saved in the switcher, is always present and cannot be overwritten without entering a user-selected Personal Identification Number (PIN) password. The configuration is restored without a PIN:

NOTE *The default PIN is 0000.*

- **Save —** Save the current configuration (excluding presets), including processors, created ties, and mic mixes as a password protected configuration. The DSP Configurator program prompts for a PIN to save.
- **Recall —** Recall the protected configuration.
- **Change PIN —** Change the PIN associated with the protected configuration.

Design Rule Verification — Compares all stored presets, checking for possible DSP overloads. See "DSP capacity and design rule verification", on page 5-30.

Connect to / Disconnect from Device (depending on *Emulate* or *Live* mode) — Performs the same functions as the Mode *Emulate* and Mode *Live* buttons.

Issue RESET Command — Initializes and clears any or all of the following: ties, mic mixes, presets, audio configuration, processor blocks, and gain blocks. This reset is identical to the Esc ZXXX ← SIS command (see chapter 4, "SIS Programming and Control").

Commit to NVRAM — Commands the switcher to save all set variables, ties, and presets to its non-volatile memory. You should do this before powering down the switcher if you have recently made changes.

Firmware Loader — Calls the Firmware Loader program, which allows you to replace the firmware that is coded on the switcher's control board without taking the switcher out of service. This is similar to the Matrix Switchers Control Program's **Update Firmware** selection. See "Update firmware", on page 5-46.

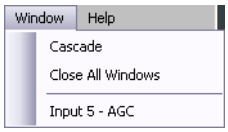
Configure Groups — Opens the Configure Groups dialog box. See "Configuring a group master" on page 5-17.

Device Setting — Opens a dialog box that provides a means to set the unit's IP address and passwords and to set the serial ports' baud rates.

Options — Opens a tabbed dialog box that allows you to tailor the DSP Configurator program's appearance and operation to your liking:

- **General —** Tailor the appearance of dynamics meters. Set meters to automatically appear (default) or require further operator action.
- **Colors —** Set the colors of various dialog boxes for a pleasing appearance.
- **Dyn Defaults —** Sets the default parameters for the automatic gain control (AGC), compressor, limiter, and noise gate processors, including whether they are initially bypassed (default) or not, when inserted. Also allows you to restore the factory defaults for these processors.
- **Filter Defaults —** Sets the default parameters for the high pass, low pass, bass, treble, parametric, and notch (feedback suppressor) filters, including whether they are initially bypassed (default) or not, when inserted. Also allows you to restore the factory defaults for these filters.
- **Gain Defaults —** Sets the default parameters for the input gain processor, output gain processor, mic gain processor, mic mix gain processor, and meter clip indicators. The gain parameters include whether they are initially muted (default for the mic gain and mic mix-points) or not. Also allows you to restore the factory defaults for these processors.
- **Other Defaults —** Sets the default parameters for the ducking, loudness, delay, and feedback suppressor processors. The feedback suppressor parameters include whether they are initially bypassed (default) or not. Also allows you to restore the factory defaults for these processors and for the entire DSP.

DSP Configurator Window menu



Cascade — Rearranges all open DSP Configurator program windows, including dialog boxes, in a cascading array.

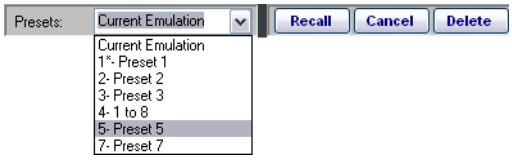
Close All Windows — Closes all open dialog boxes.

Individual windows — Brings the associated dialog box to the front of the desktop.

DSP Configurator Help selection

Opens the DSP Configurator program Help file.

DSP Configurator Presets dropbox



Displays a list of up to 32 partial or global ties (depending on how they were saved) presets. You can select a preset from the list to display it in the window and either activate it (**Recall**), abort the selection without either recalling or deleting it (**Cancel**), or delete it (**Delete**).

NOTE *The* **Recall**, **Cancel**, *and* **Delete** *buttons appear when a preset is selected.*

NOTE *An asterisk in the drop-down list indicates that a partial preset that exists only in the switcher has not been saved to the DSP Configurator's configuration file. The preset's ties and settings are not in sync between the DSP Configurator program and the switcher.*

DSP Configurator Mode buttons

Allows you to select between *Live* mode and *Emulate* mode. See "*Emulate* mode vs. *Live* mode", on page 5-23 for more information.

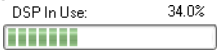
DSP capacity and design rule verification

DSP capacity

Each processor, when inserted, uses a portion of the DSP's total processing power.

- The amount of processing power for the block is constant, unchanged by parameter settings or whether it is bypassed or not.
- Processors in the program audio input (computer/audio group and video/audio group) processor chains (①, on figure 5-3) are active (using processor power) only when tied to an output.
- Processors in the program audio input (①) and line output (④ and ⑥) are stereo processors, each using two of that processor type.

The DSP Configurator program calculates the processor usage of **all** active processors in the line output (④ and ⑥) and mic input (⑤) processor chains and the six most processor-intensive input processors (①), depending on the configuration. The program displays a DSP usage meter that shows the results of this usage calculation.



The following table shows the DSP usage for each processor type, the maximum number of processors that can be active within a configuration or current state/emulation, and the potential DSP usage if all of those processors are active at the same time.

Processor type	DSP usage	Maximum # of active processors	Potential total DSP usage
Dynamic processors	0.4%	44	17.2%
Ducking blocks	1.6%	4	6.3%
Delays	1.9%	28	54.3%
FBS blocks *(dynamic filters only)*	10.6%	4	42.4%
All filters *(including fixed FBS filters)*	0.1%	208	22.9%
Loudness	0.3%	12	3.1%
		Total:	**146.2%**

NOTE *DSP usage percentages do not exactly add up to the totals due to rounding to the nearest 0.1%.*

The DSP can overload when a combination of processors is enabled that totals over 100% usage. In this case, the switcher can lock up and fail to operate, necessitating cycling power. As part of its monitoring of DSP usage, when the DSP Configurator program detects that usage is nearing the 100% threshold, it makes uninserted processor blocks unavailable for insertion. This prevents an overload caused by normal operation. However, you can recall a combination of partial presets that causes an overload. The design rule verification function (see the next page), when used properly, can avoid an overload.

Design rule verification

You can inadvertently recall a combination of partial presets that causes an overload. The user-selected design rule verification function analyzes and compares all presets.

Execute the design rule verification function by clicking **Tools** > **Design Rule Verification**.

After verification, if no combination of presets that would cause an overload is detected, the function prepares an on-screen report stating "*The current configuration has been successfully verified*".

On the other hand, if, after verification, a problem is detected, the function prepares an on-screen report stating "*Overload Possible*" and lists the specific errors that it found. This combination of partial presets, if recalled, will cause an overload. To prevent a possible overload, you need to make adjustments to your partial presets. Run the design rule verification utility again to ensure that you have resolved the potential problem.

NOTE *Extron recommends performing a design rule verification before pushing a configuration to the switcher and frequently while designing partial presets to ensure that the DSP will not be overloaded.*

If you are in *Live* mode (connected to a switcher) and any presets exist in the MPX switcher that are not present in the DSP Configurator program (indicated by an asterisk next to the preset name), the function halts and prompts the user to run a **backup**.

Backup (click **File** > **Backup**) transfers all partial presets plus the current configuration from the switcher to a DSP configuration file within the DSP Configurator program and then prompts you to save the file to your hard drive. Backup is unavailable when the DSP Configurator program is in *Emulate* mode.

Keyboard navigation

The DSP Configurator program is fully navigable using the computer keyboard. Some keyboard navigation behavior matches Windows standards, while other behaviors are specific to the DSP Configurator program.

When the program is started, the cursor focus is in the upper left corner of the program audio input (computer/audio group and video/audio group signal processor chains (① on figure 5-20). The Input 1 Gain block is green highlighted [ ]).

NOTE *The callout numbers on figure 5-20 are not the same as on figure 5-3.*

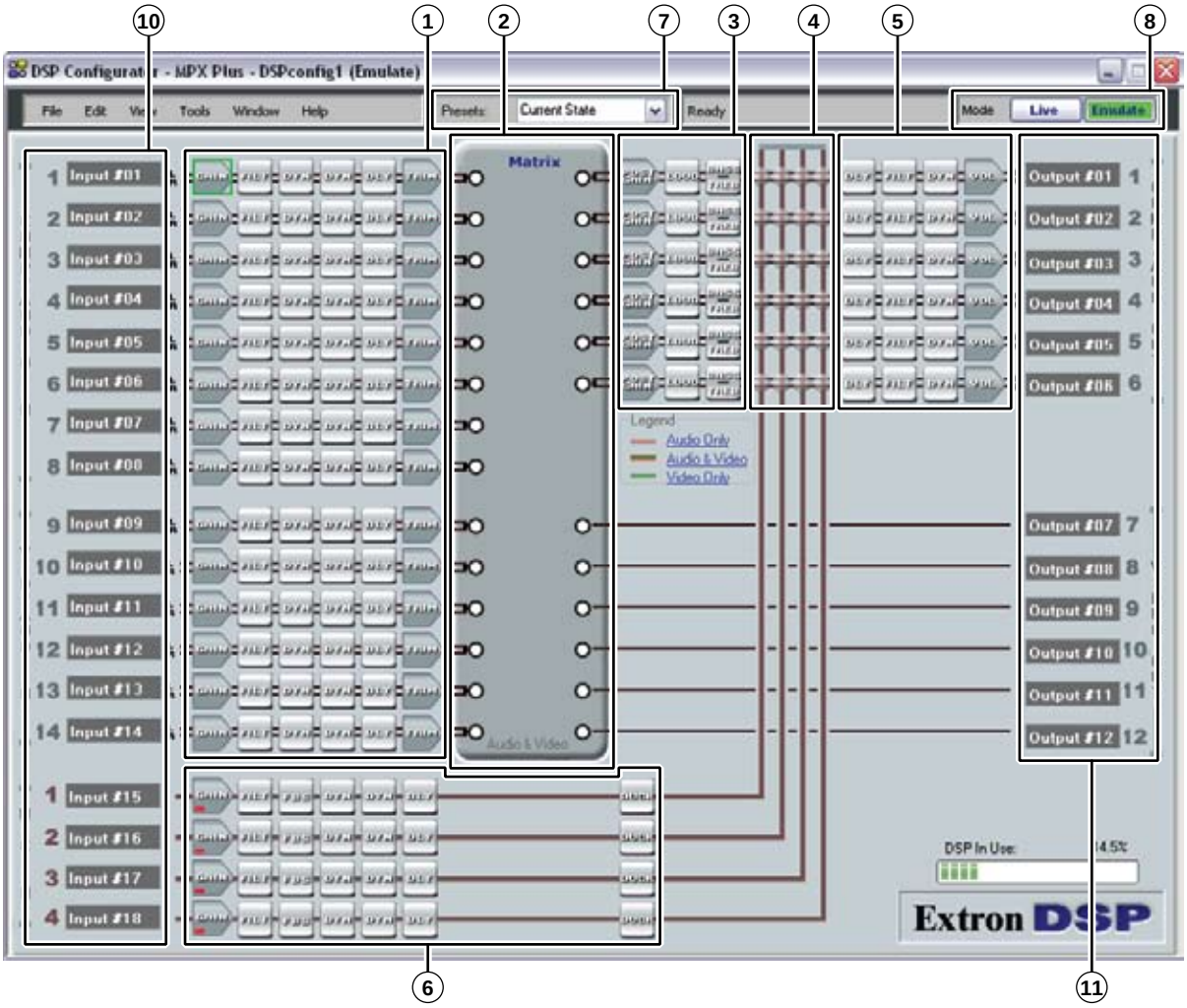


Figure 5-20 — DSP Configurator program window

Standard Windows navigation

The keyboard keys navigate and function as follows:

- **Tab key —**

  Sequentially jump among major segments of the DSP Configurator program. From the program audio input chains (①), sequential jumps are in the following order:

  - A/V matrix block (②)
  - Output signal processor chain (pre mic mixer) (③)
  - Mic mixer block (④)
  - Output signal processor chain (post mic mixer) (⑤)
  - Mic/line input signal processor chain (⑥)
  - Task bar Presets dropbox (⑦)
  - Task bar Mode buttons (⑧)

  Jump from the input 1 through 14 or mic input 1 through 4 name fields (⑩) into the nearest group of processor chains (① or ⑥).

- **Shift-Tab key combination —**

  Reverses the direction of the Tab key function.

  Jump from the output 1 through 12 name fields (⑪) into the nearest group of processor chains or the A/V matrix block (⑤ or ②).

- **Arrow (←, →, ↑, and ↓) keys —**

  Navigate up, down, left, and right within any of the areas shown on figure 5-20.

  Jump from the input 1 through 14 or mic input 1 through 4 gain blocks (① or ⑥) into the name fields (⑩).

  Jump from the output 1 through 6 volume block (⑤) or the output 7 through 12 nodes on the A/V matrix (②) into the output 1 through 12 name fields (⑪).

- **Enter Key —** Performs the same action as a mouse double-click. For example, opens the context menu from which a processor type may be selected or opens a dialog box when applicable. When an action button is highlighted, Enter executes the button action and toggles the button when applicable.

- **Control key —** The Ctrl key can be used in the following shortcuts.

  - **Ctrl-X —** Cut the selected elements.
  - **Ctrl-C —** Copy the selected elements.
  - **Ctrl-V —** Paste the selected elements.
  - **Ctrl-L —** Go to *Live* mode.
  - **Ctrl-E —** Go to *Emulate* mode.
  - **Ctrl-A —** The first press of the Ctrl-A combination highlights all A/V matrix block (②) output nodes. The second press highlights all elements within the program.

- **Alt key —** The Alt key is used with specific letter keys to open and navigate task bar menus. When the Alt key is pressed and either held or released, the first letters in the menu titles (File, Edit, View, Tools, Window, or Help) become underlined. Press the underlined letter key to open that menu.

  Once a task bar menu is open, use the up and down arrow keys to move up and down in the menu or submenu, use the right key to open a submenu (if applicable), and use the Esc key to back out of an active menu or submenu.

DSP Configurator-unique navigation

Making ties

Video and audio ties can be made from the keyboard as follows:

1. Arrow (←, →, ↑, and ↓) and/or Tab (Tab) to the A/V matrix block (②) input node (○) from which you will make the tie. The node is marked by a green outline (○).
2. Press and **hold** the Shift key while you press the right arrow → to drag the potential tie (dashed line) to the corresponding output node (input 1 to output 1, 2 to 2, and so on).

   NOTE *If input number 7 or 8 is selected in step **1**, when you perform step **2**, the potential tie is to output 6.*
3. Release the Shift key.
4. Press the Enter key to execute the tie.
5. **If desired to make additional ties from the same input**, press the up arrow ↑ or down arrow ↓ (Shift is not required) to select another output to tie to the same input.
6. **If you made additional ties from the same input**, press the Enter key to execute the tie.
7. **If desired**, repeat steps **5** and **6** to tie additional outputs to the same input.
8. **If desired to make ties from a different input**, press the left arrow ← key once, and repeat steps **1** through **7**.
9. Press the Tab key, Esc key, right arrow → key, or left arrow ← key to exit the set ties operation.

Highlighting and marking items, cutting or copying, saving a preset

When an item within the program is selected, it is green highlighted. One or more highlighted items can be cut, copied, pasted, or saved as a preset. The cut, copy, and paste functions can be performed using the task bar menus (see the Alt key, above) or the shortcuts described on the previous page.

NOTE *When an item is cut, it is not removed from its original location until it has been pasted in its new location.*

Highlight multiple elements for cut, copy, paste, or a preset as follows:

1. Use the arrow (←, →, ↑, and ↓) key(s) to move to the first block to highlight.
2. **To highlight sequential blocks:**
   a. Press and **hold** the Shift key, then use the arrow (←, →, ↑, and ↓) key(s) to navigate to and highlight additional elements.

      When you reach the last element you want highlighted, release the Shift key.
3. **To highlight non-sequential blocks**:
   a. Press and **hold** the Ctrl key, then use the arrow (←, →, ↑, and ↓) key(s) to navigate to the next desired element
   b. Release the Ctrl key.
   c. **To highlight sequential blocks,** press and hold the Shift key, then use the arrow (←, →, ↑, and ↓) key to navigate to and highlight additional elements.

d. **To move away from the highlighted block or set of sequential blocks,** press and hold the Shift key, then use the arrow (←, →, ↑, or ↓) key to move the highlighting box away from the last-highlighted element.

NOTE *If you do not perform step* **3c**, *the last selected element will not remain highlighted.*

e. Release the Shift key.

4. To highlight another element or group of elements, repeat steps **1** through **3**.

5. **To cut or copy**, press the Ctrl-X or Ctrl-C key combination.

6. **To save a preset**, press Alt > T > right arrow > down arrow > Enter (figure 5-21).

The Save a Preset dialog box appears.

a. **As desired**, Tab to the Preset Number field and type a specific preset number.

b. **As desired**, Tab to the Preset Name field and type a preset name.

NOTE *Unless you enter a specific number and/or name, the DSP Configurator program enters the next sequential unused preset number and the name "Preset {number}.*

c. Tab to highlight the **OK** button and press the Enter key.

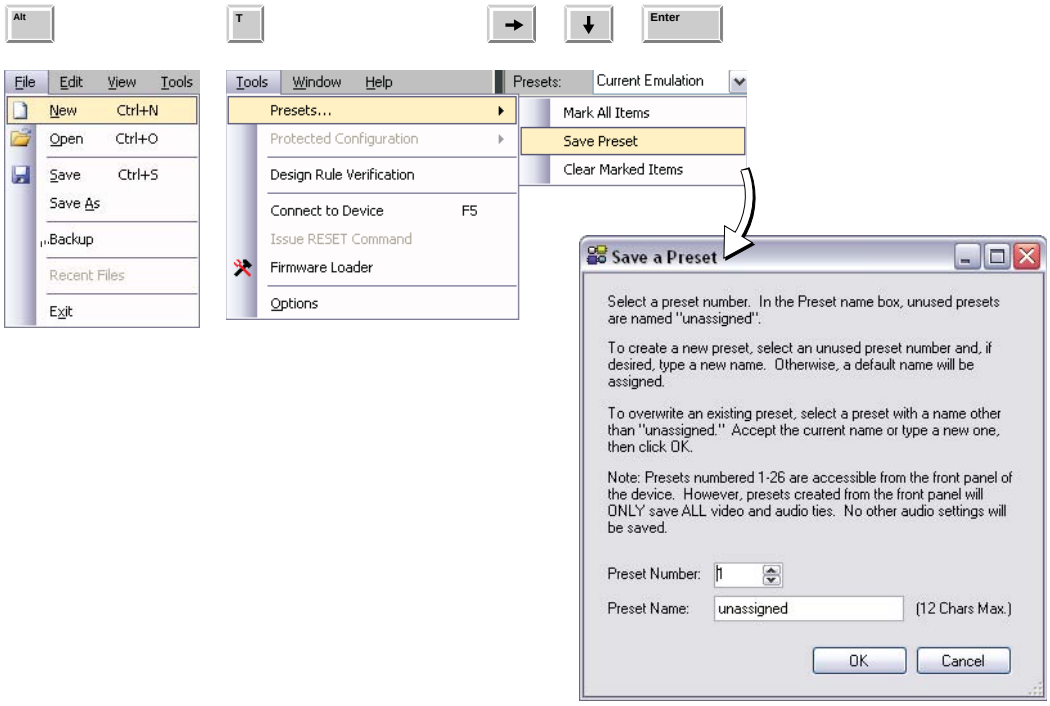

Alt
T
Enter
File Edit View Tools
New Ctrl+N
Open Ctrl+O
Save Ctrl+S
Save As
Backup
Recent Files
Exit
Tools Window Help
Presets...
Protected Configuration
Design Rule Verification
Connect to Device F5
Issue RESET Command
Firmware Loader
Options
Presets: Current Emulation
Mark All Items
Save Preset
Clear Marked Items
Save a Preset
Select a preset number. In the Preset name box, unused presets are named "unassigned".
To create a new preset, select an unused preset number and, if desired, type a new name. Otherwise, a default name will be assigned.
To overwrite an existing preset, select a preset with a name other than "unassigned." Accept the current name or type a new one, then click OK.
Note: Presets numbered 1-26 are accessible from the front panel of the device. However, presets created from the front panel will ONLY save ALL video and audio ties. No other audio settings will be saved.
Preset Number: 1
Preset Name: unassigned
(12 Chars Max.)
OK
Cancel

Figure 5-21 — Saving a preset using keyboard navigation

Setting group master soft limits

- **Shift in a combination moves the upper limit —**
  - **Shift-Up/down arrow** **or** — Moves the soft upper limit in 0.1 dB increments.
  - **Shift-Page Up/Page Down arrow** **or** — Moves the soft upper limit in 10 dB increments.
  - **Shift-Home** — Moves the soft upper limit to the upper default.
  - **Shift-End** — Moves the soft upper limit to the fader's position.
- **Ctrl in a combination moves the lower limit —**
  - **Ctrl-Up/down arrow** **or** — Moves the soft lower limit in 0.1 dB increments.
  - **Ctrl-Page Up/Page Down arrow** **or** — Moves the soft lower limit in 10 dB increments.
  - **Ctrl-Home** — Moves the soft lower limit to the fader's position.
  - **Ctrl-End** — Moves the soft lower limit to the lower default.

Optimizing the Audio

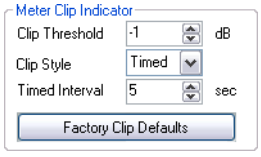
Program material that you are familiar with is preferable for the following procedures, otherwise, pink noise can be used.

TIP *The Extron VTG 300 or VTG 400 is recommended to provide the pink noise.*

Input clipping and clipping meters

Audio clipping is a form of distortion that occurs when the signal peaks (or excursions) exceed the limits of the circuit, cutting off the excursions of a signal. This condition gives audibly undesirable results. While it is difficult to clip the audio signal within the DSP audio signal chain, it is extremely important that the audio signal is not clipped before the input to the switcher. Once audio is clipped at the input, there is no remedy further down the signal chain. However, if audio clipping occurs at the output of the DSP that is not a result of clipping at the input, this can be addressed in the DSP audio signal chain.

Meters are available in the gain controls ( ) and in the dynamic processor blocks ( ) when the program is in Live mode and an audio signal is applied to the DSP. The meters in the DSP Configurator program indicate clipping at a user-definable level, with the default setting at -1 dB. At the -1 dB setting, the meter indicates clipping when it reaches -1 dBFS, or 1 dB below actual clipping. Setting the clipping meter below actual clipping provides a bit of a "safety net", letting you know to pull back on input gain before clipping actually occurs. You can increase or decrease this safety net by clicking **Tools**>**Options**, selecting the **Gain Defaults** tab, and setting the clip threshold to a number between 0 dB and -20 dB. When the clip threshold is set to 0 dB, clipping is indicated only when actual clipping occurs.



Meters within the DSP Configurator program are peak-type meters, referenced to "full scale," or 0 dBFS. For the MPX Plus 866 A, 0 dBFS corresponds to 22 dBu, which is the maximum output level of the switcher.

Setting the input and output gain structure

Before calibrating loudness, set up the system gain structure.

1. Set the signal generator to output -10 dBFS or use recorded program material at -20 dBFS.
2. Set the input gain in the DSP Configurator so that the input meter reads -20 dBFS.

NOTE *In step **3**, if using a recorded source and the player has an output level setting control, ensure that the output of the player is set to its maximum, or 0 dB of attenuation.*

3. For program material, set the input level to approximately -15 dBFS, with peaks at no more than -5 dBFS to -3 dBFS. This setting provides enough headroom to accommodate transients or unanticipated loud events in the program material in order to avoid possible clipping.
4. Tie the audio from the source to the speakers that will carry program material in the room to be calibrated.
5. With the output channel volume set to -20 dB, listen to the audio output while you set the external amplifier so that the source material plays at a volume level that is reasonably loud but tolerable, while verifying that the amplifier is not clipping by observing the amplifier clip indicator.

Adjusting the pre-matrix

The pre-matrix trim control can be used to compensate for any level changes caused by signal processing before the trim control. Adding a compressor generally reduces the signal level, while a filter can either boost or cut the overall signal level.

NOTE *This procedure is valid only if no processing is active in the output signal path, and if post-matrix trim value is set to 0 dB (unity gain). If you have processors inserted in the output signal path, open them and bypass them to temporarily remove them from the signal path.*

1. After you have set the input gain, add any processors that you wish to use into the input signal chain.

TIP *If you make changes to filter settings after you have set your dynamics processors, recheck the levels in your dynamics processors to make sure that they are still valid.*

2. Open the line input gain dialog box, the output volume dialog box, and the pre-matrix trim dialog box.
3. Set output volume to 100%. If the audio is too loud or distracting, mute the output.
4. With program material (or pink noise) present at the input, adjust the pre-matrix trim so that the meter level in the output volume dialog box matches the meter level in the input gain dialog box. This maintains the audio at an optimal level in the input signal chain.

TIP *This is a good baseline. If, after you've set up your microphone input gain and mix-point levels, output processing, and post-matrix trim levels, you find that you need more headroom to prevent clipping at the outputs, return to the pre-matrix trim controls and lower each trim by the same dB amount.*

You may also find that further minor adjustments to the pre-matrix Trim controls help to balance out the perceived audio levels of the different inputs.

Finalizing the output gain structure

Adding a compressor generally reduces the signal level, while a filter may boost or cut the overall signal level. Loudness boosts the overall signal level, but mostly at lower volume settings (see "Calibrating loudness" for more information).

1. Add any processors that you wish to use into the output signal chain.

   After adding processors to the output signal chain, the output volume level may clip when set to or near 100%.

2. Set output volume to a level where clipping is eliminated.

TIP *Remember that the output volume control is essentially the same volume control that is accessible to a front panel or Matrix Switchers Control Program operator. These operators may unknowingly change the volume back to a level where clipping occurs. You reduce the chance of this inadvertent clipping by using the post-matrix trim control rather than the volume control (see "Adjusting the post-matrix trim").*

NOTE *Mic levels also contribute to possible clipping at the outputs. They may need to be lowered at the mic mix-points to maintain the balance between program material (line inputs) and voice (mic).*

Setting the mic input and mic mix-point levels

1. Double-click the mic mix-point to be set, opening the dialog box for that mix-point.
2. Unmute the mix-point (mixing in the mic signal). The default level is 0.0 dB, or unity gain.
3. Connect your chosen microphone to mixed mic/line input.
4. Open the mic input gain dialog box for the mixed mic.
5. If your mic requires phantom power, turn it on in the mic input dialog box.
6. Unmute the mic/line input.
7. While testing the mic, raise the mic gain fader until the mic is clearly audible.

   The gain level and the mic gain meter level reading vary at this point, but as a general guideline, the input gain level is approximately 40 dB to 50 dB and the meter averages approximately -20 dBFS.

TIP *You want to optimize audio here, but voice levels at microphone inputs can vary greatly. Having the meters average around -20 dBFS gives enough headroom to accommodate sudden changes to voice levels. Further adjustment may be necessary.*

Adjusting the post-matrix trim

Adjusting the post-matrix trim is a bit of a balancing act. This section provides guidelines, but it may take a bit of going back and forth to set levels just right. For example, the output level can be controlled and kept below clipping using a compressor or limiter in the output dynamics block. However, adjusting the post-matrix trim affects how the compressor or limiter works.

1. Open the output volume dialog box and the post-matrix trim dialog box.
2. Set output volume to 100% (if the audio is too loud or distracting, mute the output).
3. With program material or pink noise present at the input, adjust the post-matrix trim until the output volume dialog box's meter level is below clipping (or ideally, matches the level at the input gain meter). This maintains the audio at an optimal level in the output signal chain, and prevents clipping at the output.

Setting the volume control for the amplifier stage

The switcher's maximum output is +22 dBu. Assume that you have a power amp with a maximum input level of +4 dBu when the input attenuator is fully open. If you want to control volume levels using the switcher's non-DSP output volume controls and at the same time ensure that clipping does not occur at the amplifier, you need to turn down the power amp's input attenuator the equivalent of 18 dB (18 + 4 = 22 dB), which puts the amp's input level at -14 dB (+4 minus 18 = -14). If you find that the amp setting (when the DSP Configurator's output volume controls are at 100%) is too loud for the room, you can turn it down further. If the amp is not loud enough for the room, you will need a more powerful amplifier.

On the other hand, if you wish to control volume levels using the power amplifier's input attenuation control, (using the same power amp max input level) you can set the DSP Configurator's output volume control to -18 dB. This is another way that clip points of the two devices will be matched, ensuring that clipping will not occur.

However, Extron recommends using the matrix switcher's output volume control for controlling output volume. If you are using loudness processing on the unit, it works only in conjunction with the output volume control.

Calibrating loudness

The basic gain structure is now set up. From this point, loudness can be calibrated using an SPL meter, a critical ear, or a combination of the two.

Setting loudness using a meter

To calibrate loudness, use a sound pressure level meter set to "C" weighting.

1. Open the post-matrix loudness processor dialog box.
2. Bypass the loudness processor.
3. Place the meter in an average listening location.
4. Start your program material playback or generate pink noise.
5. Measure the SPL in the room.

6. In the loudness dialog box, adjust the fader until the value in the "SPL" readout box matches the reading on the SPL meter.

NOTE *Calibration can be performed with the output channel volume set to any comfortable listening level, but a relatively loud volume that can be easily measured is preferred.*

Loudness is now calibrated.

7. Release the loudness processor's bypass to hear the compensation.

Alternate method:

NOTE *This method works if 90 dB is an acceptable amplifier/volume limit for the room.*

1. Set the loudness dialog box's Loudness Compensation slider to its default (center) position and the output channel volume fader to 0 dB (100% volume).
2. Adjust the amplifier until the SPL meter reads 90 dB. Loudness is now calibrated.

Setting loudness "by ear"

When setting loudness by ear, it is also essential that the system gain structure be set up first.

1. Open the post-matrix loudness processor dialog box.
2. Bypass the loudness processor.
3. Place the meter in an average listening location.
4. Set the output volume fader to a relatively quiet listening level. (Filter compensation from the loudness processor is most prominent at low listening levels. Set to the levels described earlier.)
5. Set the loudness dialog box's Loudness Compensation slider to its default (center) position.
6. Release the loudness processor's bypass to hear the compensation.

NOTE *You should hear a moderate enhancement to the program material with more accentuated bass frequencies (below 500 Hz) and more brightness in the high frequencies that carry harmonic content (above 7 kHz). You can toggle the loudness bypass on and off to compare the difference between loudness off and on.*

7. To experiment with less loudness compensation, move the Loudness Compensation slider to the left, toward Less.

   For more loudness compensation, move the slider to the right, toward More.
8. Any adjustment you make to the Loudness Compensation slider carries through to all listening levels. Set the DSP Configurator output volume to a relatively loud listening level.
9. Toggle the loudness bypass on and off to compare the difference between loudness off and on. At a loud listening level, this difference should be minimal, or barely perceivable.

Matrix Switchers Control Program

Starting the program

Many items found in the Matrix Switchers Control Program (the WCP) are also accessible via optional front panel controls (see chapter 3, "Operation") and under SIS control (see chapter 4, "SIS Programming and Control"). The Matrix Switcher Help Program provides information on settings and on how to use the control program itself.

1. To run the Matrix Switchers Control Program, click **Start** > **Programs** > **Extron Electronics** > **Matrix Switchers** > **MATRIX Switcher + Control Pgm**.

   The Comm Port Selection window (figure 5-22) appears.

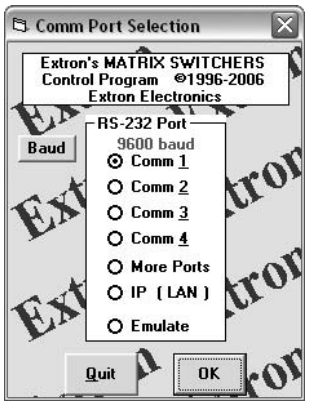
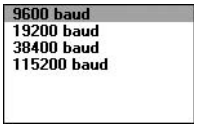


Figure 5-22 — Comm port selection window

2. Choose the comm port that is connected to the matrix switcher's RS-232 port, **IP [LAN]**, or **Emulate**.

   - **If you selected a comm port**, check the baud rate displayed in the comm port selection window. If you need to change the baud rate, click on the Baud button and double-click on the desired baud rate.

     Click *Ok* and proceed to step **4**.

   - **If you selected IP [LAN]**, click **Ok** and proceed to step **3**.
   - **If you selected Emulate**, click **Ok** and see "Using Emulate mode" on page 5-57.

3. **If you selected IP [LAN] in step 2**, the IP Connection window appears (figure 5-23).

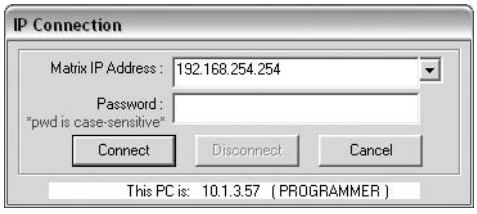


Figure 5-23 — Address and password entry

a. Examine the Matrix IP Address field in the IP Connection window. The field displays the last Extron IP address entered.

If the IP address is correct: Proceed to step **3b**.

If the address is not correct: Either click in the Extron IP Address field and enter the IP address or click on the scroll down button (▾) and select from among the recently used addresses. Proceed to step **3b**.

NOTE *If the local system administrators have not changed the value, the factory-specified default, 192.168.254.254, is the correct value for this field.*

b. If the switcher is password protected, click in the Password field and enter the appropriate administrator or user password.

c. Click **Connect**.

If you logged on using the administrator password, the program connects you to the matrix switcher with all of the administrator rights and privileges.

If you logged on using the user password, the program connects you to the matrix switcher with only user capabilities.

If an incorrect password was entered, the program beeps and returns to the password entry display.

4. The Extron Matrix Switchers Control Program window (figure 5-24 and figure 5-25) appears. The window displays the current configuration of the attached matrix and provides a way to make or break ties.

- To create a tie, drag an input box to one or more output boxes. To remove a tie, drag the output box to its tied input box or to the trash can.

NOTE *Video and audio ties between the low resolution video input group and the low resolution video output group are **always** made with the audio redirected. In such an operation, the switcher automatically ties the audio to an output in the computer video/audio outputs group (outputs 1 through 6) as follows:*

- *If the video is tied to output 7, the audio is tied to output 1.*
- *If the video is tied to output 8, the audio is tied to output 2.*
- *If the video is tied to output 9, the audio is tied to output 3.*
- *If the video is tied to output 10, the audio is tied to output 4.*
- *If the video is tied to output 11, the audio is tied to output 5.*
- *If the video is tied to output 12, the audio is tied to output 6.*

- To set up audio in follow mode (audio and video have the same tie configuration), select the Follow box at the bottom of the window. To set up audio in breakaway mode (audio and video have different tie configurations), deselect the Follow box.
- The Matrix Switchers Control program displays Mic audio ties, but they can be made only in the DSP Configurator program. See "DSP Configurator Program", earlier in this chapter.
- To make the control program easier to use, assign a device icon to each input and output. Click on a box that represents an input or output, and drag the desired icon onto the box from the icon palette that appears.
- For quick display of information on a specific input or output device, position the cursor over that device in the control program window. The program opens a window that details the connections to that device, the audio level, and, for outputs in the computer video group only, the switching interval (RGB delay) and the frequency of the video signal input from or output to that device. See the inset box in figure 5-25.

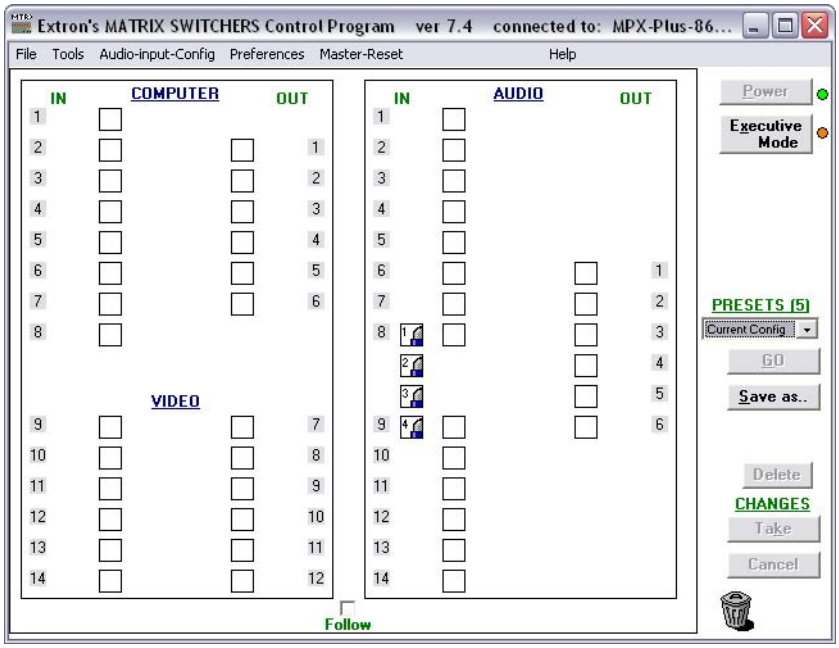


Figure 5-24 — Sample Program window (no icons or ties)

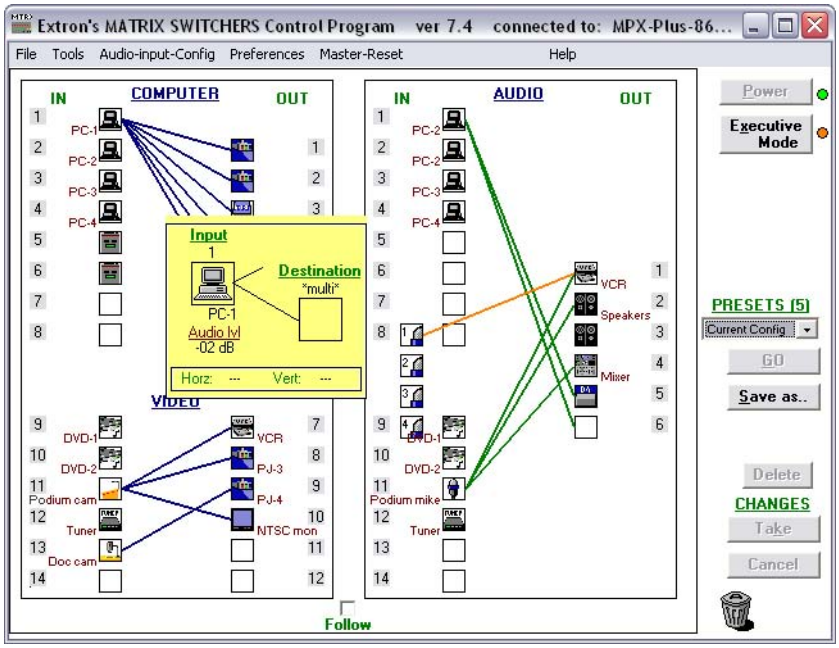


Figure 5-25 — Sample program window (icons assigned and ties made)

TIP *You can print a map of the current configuration by clicking* **File** > **Print Tie Map**.

- If desired, on the task bar, click **Tools** > **IP Options** to set the switcher's IP parameters in the IP Settings/Options window (figure 5-26).

IP Settings/Options window

The IP Settings/Options window (click **Tools** > **IP options**, figure 5-26) provides a location for viewing and, if connected via one of the RS-232 ports or if logged on via the Ethernet port as an administrator, editing settings unique to the Ethernet interface. See appendix A, "Ethernet Connection", for basic information about IP addresses. None of the fields on this screen can be edited while you are logged on as a user.

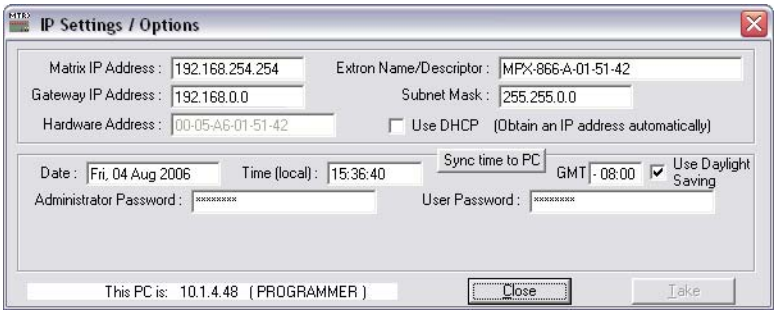

IP Settings / Options
Matrix IP Address : 192.168.254.254
Extron Name/Descriptor : MPX-866-A-01-51-42
Gateway IP Address : 192.168.0.0
Subnet Mask : 255.255.0.0
Hardware Address : 00-05-A6-01-51-42
Use DHCP (Obtain an IP address automatically)
Date : Fri, 04 Aug 2006
Time (local) : 15:36:40
Sync time to PC
GMT - 08:00
Use Daylight Saving
Administrator Password : ********
User Password : ********
This PC is: 10.1.4.48 (PROGRAMMER)
Close
Take

Figure 5-26 — Control program IP setting/options window

NOTE *Editing variables on the IP Settings/Options screen while connected via the Ethernet port can immediately disconnect the user from the switcher. Extron recommends editing the settings on this screen using the RS-232 link and protecting the Ethernet access to this screen by assigning an administrator's password to qualified and knowledgeable personnel only.*

NOTE *When the control program is connected to the switcher via the RS-232 link, the Administrator and User Password fields are not masked. If a password has been inadvertently changed to an unknown value, you can look up and, if desired, change a password in this window without knowing the current password.*

Address and Name fields

The **Matrix IP Address** field contains the IP address of the connected matrix switcher. This value is encoded in the flash memory in the switcher.

The **Gateway IP Address** field identifies the address of the gateway to the controlling PC to be used if the matrix switcher and the mail server are not on the same subnet.

The **Subnet Mask** field is used to determine whether the matrix switcher is on the same subnet as the controlling PC when you are subnetting. For more information, see "Subnetting — A Primer", in Appendix A, "Ethernet Connection".

Valid addresses consist of four 1-, 2-, or 3-digit numeric subfields, properly called octets, separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to 3 digits total per field, are optional. Values of 256 and above are invalid.

The default addresses are as follows, but if these conflict with other equipment at your installation, you can change the addresses to any valid value:

- IP address 192.168.254.254
- Gateway address 0.0.0.0
- Subnet mask 255.255.0.0

NOTE *The address fields are cannot be edited when DHCP is selected.*

The **Extron Name/Descriptor** field contains the name of the matrix switcher. This descriptor can be changed to any valid name, up to 12 alphanumeric characters.

NOTE *The following characters are invalid in the Extron Name/Descriptor field: {space} + ~ , @ = ‘ [ ] { } < > ’ “ ; : | \ and ?.*

Edit any of these fields as follows:

1. Click in the desired field. The graphic cursor becomes a text cursor.
2. Edit the address or name as desired.
3. Press the Tab key on the keyboard or click in another field to exit the field.
4. Click the **Take** button to make the address change take affect.

Hardware Address field

The hardware address (MAC address) is hardcoded in the matrix switcher and cannot be changed.

Use DHCP checkbox

The Use DHCP checkbox directs the matrix switcher to ignore any entered IP addresses and to obtain its IP address from a Dynamic Host Configuration Protocol (DHCP) server (if the network is DHCP capable). Contact the local system administrator.

Date, Time (local), and GMT (offset) fields

The **Date** field displays the current date in the Greenwich Mean Time zone.

The **Time (local)** field displays the current time in the local time zone.

The **GMT** field displays the amount of time, in hours and minutes, that the local time varies from the GMT international time reference.

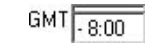
NOTE *Rather than the following procedure, your can click the* **Sync Time to PC** *button to set the switcher to your computer's internal time.*

If desired, adjust any of these values as follows:

1. Click in the desired field. The field changes to an editable field appropriate to the value being change and the graphic cursor becomes a text cursor.
   - The **Date** field is in the format (M)M/(D)D/YYYY. Leading zeroes are not shown.

   - The **Time (local)** field is in the format HH:MM:SS, (00:00:00 to 23:59:59).

   - The **GMT** field (offset from GMT) is in the format ±HH:MM (–12:00 to +14:00).

2. Edit the field as desired to set the proper proper value. For time, use the 24-hour time standard. Leading zeroes are optional.
3. Press the Tab key on the keyboard or click in another field to exit the set date , set time, set offset field.
4. Click the **Take** button to make the date change take affect.

Sync Time to PC button

Clicking the **Sync Time to PC** button causes the computer you are operating to send its internal time to the switcher in a set time command.

Use Daylight Savings checkbox

If desired, click in the **Use Daylight Savings** checkbox. When Daylight Saving Time is turned on, the switcher automatically updates its internal clock between Standard Time and Daylight Saving Time in the spring and fall on the date that the time change occurs in the country or region selected. When Daylight Saving Time is turned off, the switcher does not adjust its time reference.

Administrator Password and User Password fields

The Administrator Password field displays the password required to log on to the matrix switcher via the Ethernet port with all of the administrator's rights and privileges. The User Password field displays the password required to log on to the matrix switcher via the Ethernet port as a user, without all of the administrator's rights and privileges. Passwords are case sensitive and are limited to 12 upper-case and lower-case alphanumeric characters.

While you are logged on as a user, both password fields are masked with asterisks (**********) as a security measure.

NOTE *Editing the Administrator Password field while connected via the Ethernet port can immediately disconnect the user from the switcher. Extron recommends editing this field using one of the serial ports and protecting the Ethernet access to this screen by assigning an administrator's password to qualified and knowledgeable personnel only.*

NOTE *An administrator password must be created before a user password can be created.*

NOTE *The following characters are invalid in passwords: {space} + ~ , @ = ' [ ] { } < > ' " ; : | \ and ?.*

Edit either password field as follows:

1. Click in the desired Password field. The pointer tool becomes a text cursor.
2. Edit the case-sensitive password as desired.
3. Press the Tab key on the keyboard or click in another field to exit the Password field.
4. Click the **Take** button to make the password change take effect.

Update firmware

The firmware upgrade utility provides a way to replace the firmware that is coded on the switcher's control board without taking the switcher out of service.

NOTE *The update firmware utility is for replacing the firmware that controls all switcher operation. This is **not** the selection to insert your own HTML pages. See "Upload HTML files" to insert custom HTML pages.*

Update the switcher firmware as follows:

1. Visit the Extron Web site, www.extron.com, click the **Download Center** tab, and then click the **Firmware** link (figure 5-27).

NOTE *The version, release date, and size shown are sample values only.*

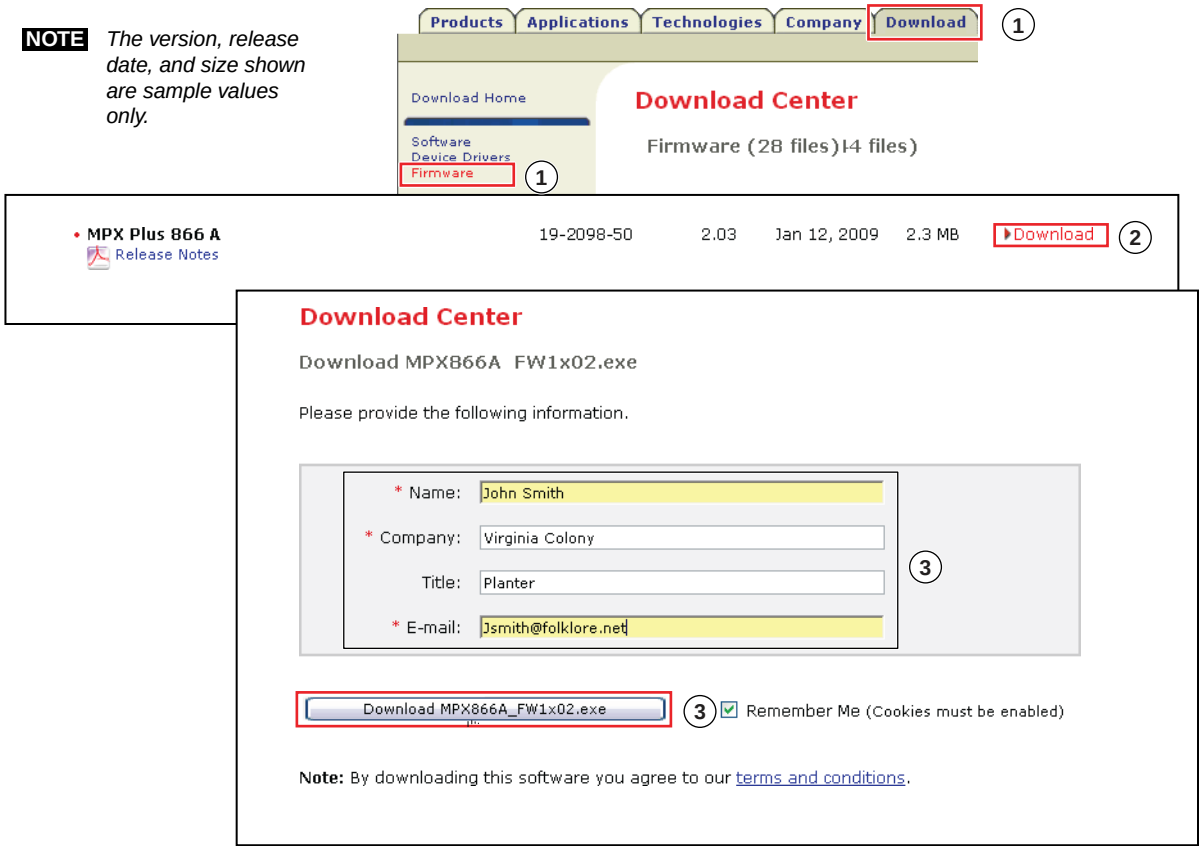
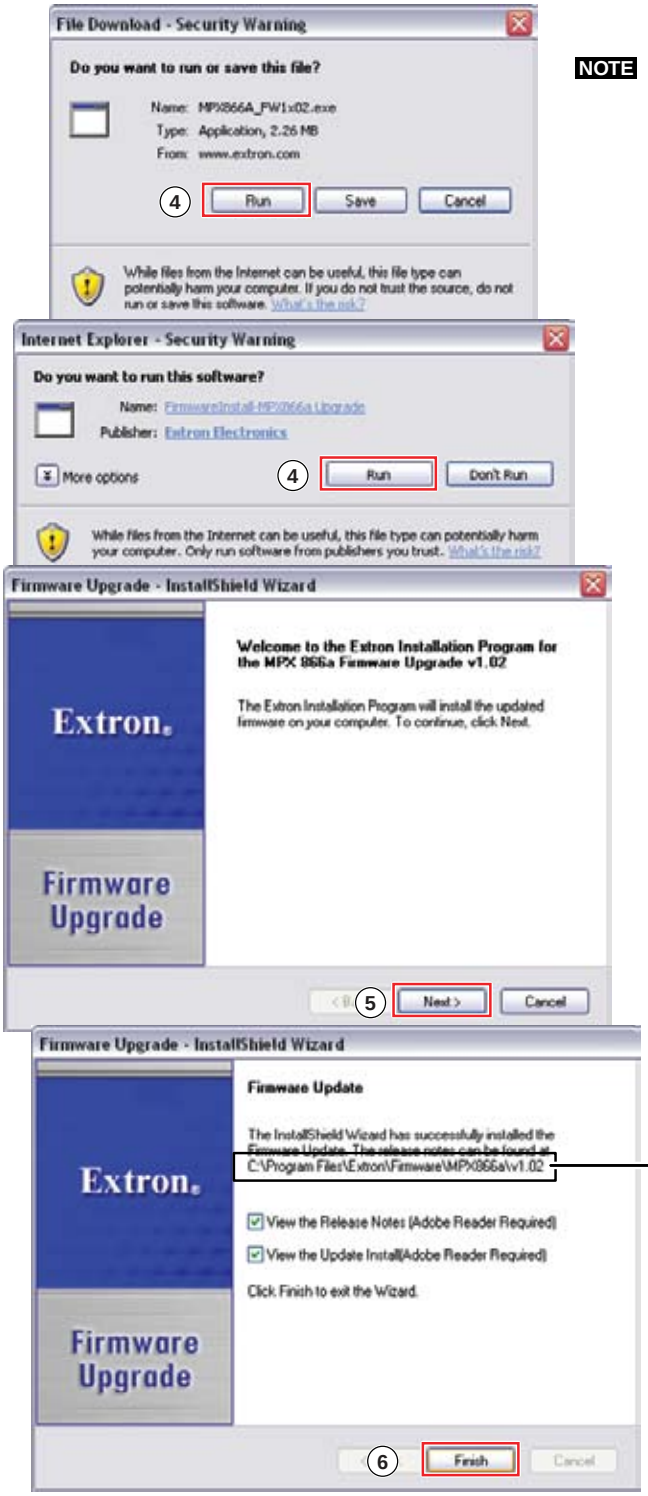


Figure 5-27 — Location of firmware upgrade files on the Web site

2. Select the appropriate firmware file to download and click **Download**.
3. Enter the requested personal information and then click **Download** to copy the firmware to your computer.
4. Click **Run** twice (figure 5-28). The PC downloads the firmware update from the Extron Web site and starts the Extron Installation Program to extract the firmware file.


File Download - Security Warning
Do you want to run or save this file?
Name: MPX866A_FW1x02.exe
Type: Application, 2.26 MB
From: www.extron.com
Run
Save
Cancel
4
While files from the Internet can be useful, this file type can potentially harm your computer. If you do not trust the source, do not run or save this software. What's the risk?
Internet Explorer - Security Warning
Do you want to run this software?
Name: FirmwareInstall-MPX866a Upgrade
Publisher: Extron Electronics
More options
Run
Don't Run
4
While files from the Internet can be useful, this file type can potentially harm your computer. Only run software from publishers you trust. What's the risk?
Firmware Upgrade - InstallShield Wizard
Extron.
Firmware Upgrade
Welcome to the Extron Installation Program for the MPX 866a Firmware Upgrade v1.02
The Extron Installation Program will install the updated firmware on your computer. To continue, click Next.
5
Next >
Cancel
Firmware Upgrade - InstallShield Wizard
Extron.
Firmware Upgrade
Firmware Update
The InstallShield Wizard has successfully installed the Firmware Update. The release notes can be found at C:\Program Files\Extron\Firmware\MPX866a\v1.02
View the Release Notes (Adobe Reader Required)
View the Update Install(Adobe Reader Required)
Click Finish to exit the Wizard.
6
Finish
Cancel

NOTE *The version shown is a sample value only.*

Folder where firmware is installed

Figure 5-28 — Downloading firmware upgrade files

5. Click **Next**. The program extracts the firmware files and places them in a folder identified in the InstallShield Wizard window.

NOTE *Note the folder to which the firmware file is saved.*

6. Click **Finish** to exit the program.

7. Connect a computer running the Windows Operating Systemto either switcher serial port or the switcher LAN port. See chapter 2, "Installation", for more details.

8. Start the Matrix Switchers Control Program and connect to the matrix switcher. See "Starting the program" in this chapter, steps **1** through **4**, starting on page 5-41.

9. Click **Tools** > **Update Firmware...** .

   If you are connected via the LAN port, the select file window appears (figure 5-29). See "Ethernet-connected firmware upload", below.

   If you are connected via either serial port, the Extron Firmware Loader appears (figure 5-30). See "Serial-port-connected firmware upload", on page 5-50.

Ethernet-connected firmware upload

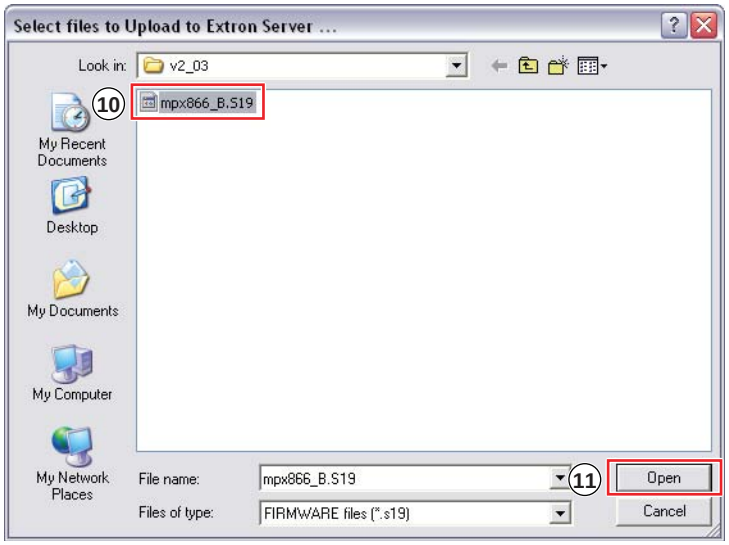


Figure 5-29 — Select file window

10. Navigate to the folder where you saved the firmware upgrade file. Select the file.

NOTE *Valid firmware files must have the file extension .S19. Any other file extension is **not** a firmware upgrade.*

NOTE *The original factory-installed firmware is permanently available on the MPX switcher. If the attempted firmware upload fails for any reason, the switcher reverts to the factory-installed firmware.*

11. Click the **Open** button. The software advises you that you are about to reprogram the switcher's firmware. Click **OK** to continue.

    A status window, which shows the progress of the upload, appears. The firmware upload to the MPX switcher may take a few minutes. When the upload is complete, the program closes.

Serial-port-connected firmware upload

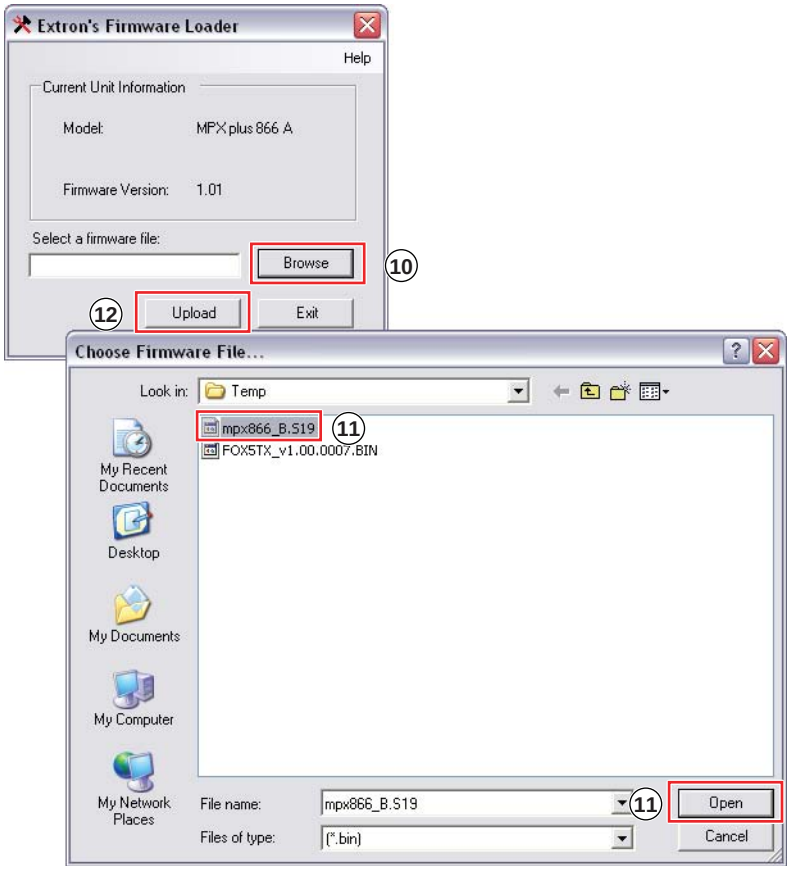


Figure 5-30 — Firmware loading

10. Click **Browse**. The Choose Firmware File window appears.

11. Navigate to the folder where you saved the firmware upgrade file. Select the file and click **Open**. The Firmware Loader window returns to the top.

NOTE *Valid firmware files must have the file extension ".S19". Any other file extension is not a firmware upgrade for your matrix switcher.*

12. Click **Upload**. The File Loader advises you that using the Ethernet (LAN) port is preferred over using either serial port (figure 5-31).

To quit the firmware upload and start over using the LAN port, click the **Cancel** button and return to step **7**. Use the LAN port connection in step **7**.

To continue the firmware upload using either serial port connection, click the **OK** button. The program prompts you to identify the serial port to which you are connected. Continue to step **13**.

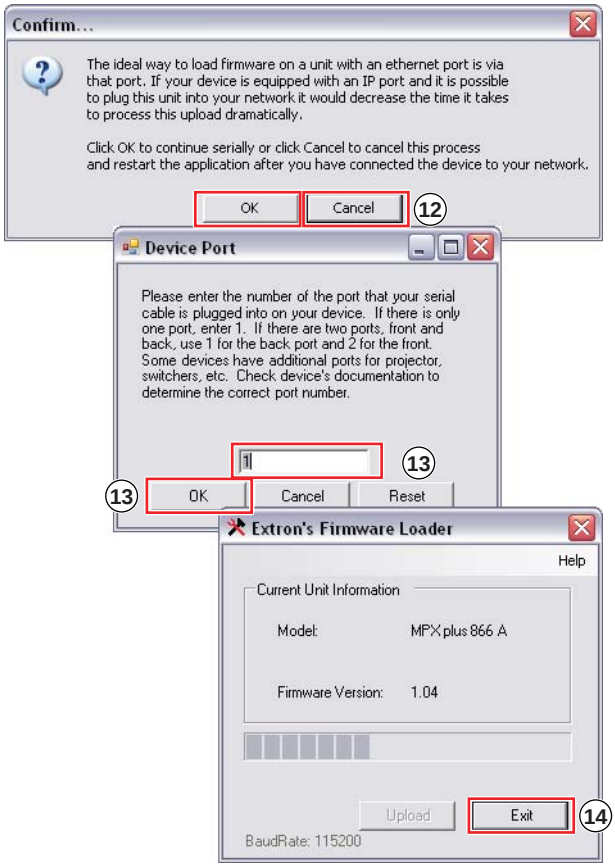

Confirm...
The ideal way to load firmware on a unit with an ethernet port is via that port. If your device is equipped with an IP port and it is possible to plug this unit into your network it would decrease the time it takes to process this upload dramatically.
Click OK to continue serially or click Cancel to cancel this process and restart the application after you have connected the device to your network.
OK
Cancel
12
Device Port
Please enter the number of the port that your serial cable is plugged into on your device. If there is only one port, enter 1. If there are two ports, front and back, use 1 for the back port and 2 for the front. Some devices have additional ports for projector, switchers, etc. Check device's documentation to determine the correct port number.
1
13
13
OK
Cancel
Reset
Extron's Firmware Loader
Help
Current Unit Information
Model:
MPX plus 866 A
Firmware Version:
1.04
Upload
Exit
14
BaudRate: 115200

Figure 5-31 — Confirm window

13. If necessary, change the port number in the device port field:

    - Rear panel RS-232 Primary port, enter **1**.
    - Front panel Configuration portor rear panel RS-232 Secondary port, enter **2**.

    Click the **OK** button. The Firmware Loader reports, "*This process could take several minutes. Please wait...*", then displays a status bar that shows the progress of the upload. When the upload is complete, the Firmware Loader reports "*Unit resetting, this can take some time, please wait. ...*", and then "*Transfer complete!*".

14. When the Firmware Loader reports, "*Transfer complete!*", click the **Exit** button on the Firmware Loader and then again on the port configuration window. The Firmware Loader and the Matrix Switchers Control Program close.

Upload HTML files

NOTE *The HTML Files List window is for inserting your own HTML pages. This is* ***not*** *the window to replace the firmware that controls all switcher operation. See "Update firmware" in this chapter to replace the firmware.*

You can create customized HTML pages for the switcher to display. The HTML Files List window (figure 5-32) provides a way to view the contents of the switcher's file system and upload custom HTML pages to the switcher.

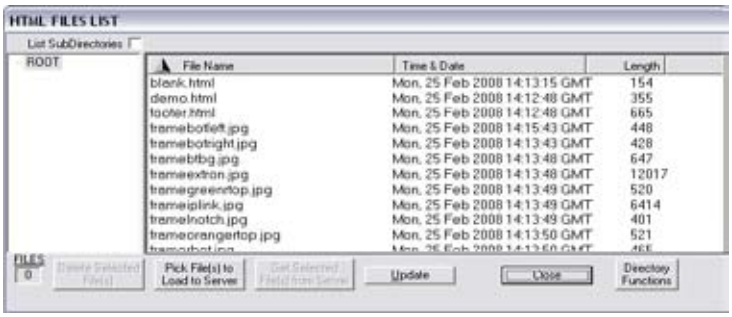


Figure 5-32 — HTML Files List window

NOTE *The files listed in figure 5-32 are shown for example only and may not be present on your switcher.*

Upload HTML pages as follows:

NOTE *The following characters are invalid in file names: {space} + ~ , @ = ' [ ] { } < > ' " ; : | \ and ?.*

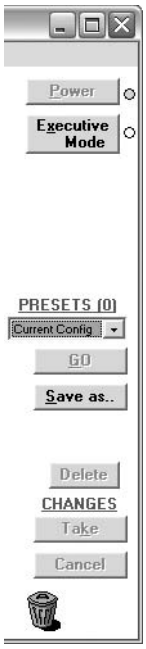
1. Connect the PC to the matrix switcher via one of the switcher's RS-232 ports or Ethernet port.
2. Start the Matrix Switchers Control Program and connect to the MPX switcher. See "Starting the program" in this chapter, steps **1** through **4**, starting on page 5-41.
3. Click **Tools** > **HTML File Manager**.
4. Click the **Pick File(s) to Load to Server** button. An open file window appears.
5. Navigate to the folder where you saved the HTML file(s). Select the file(s).

NOTE *To select multiple files, hold the Ctrl key while you select the desired files.*

NOTE *If you want one of the HTML files that you created to be the default start-up page, name the file "index.html". The MPX switcher automatically looks for that file name when you first connect to it using an Internet browser.*

6. Click on the **Open** button. The file(s) upload to the MPX switcher may take a few minutes.
7. Click on the **Update** button to confirm the upload.
8. Click on the **Close** button to exit the HTML Files List window.

WCP Windows buttons, drop boxes, and trash



The buttons, drop boxes, and trash can on the right side of the program window perform the following functions:

Power — Unavailable for MPX Plus 866 A switcher, because the switcher power cannot be controlled via software.

Executive Mode — Allows you to lock out front panel operations, except for the view-only mode functions. Click the button to cycle between *Lock* mode 0 (the indicator is white), *Lock* mode 1 (the indicator displays red), and *Lock* mode 2 (orange).

NOTE *See "Setting the front panel locks (*Executive *modes)" in chapter 3, "Operation" for more information on the* Lock *modes.*

Presets menu — Displays a list of up to 32 presets. You can select a preset from the list to display it in the window and either activate it (**Go**) or delete it (**Delete**).

Go — Activates the selected preset as the current configuration.

Save as — Allows the current set of ties to be saved as a preset. Enter the preset number when prompted to do so.

Delete — Allows the current preset to be deleted.

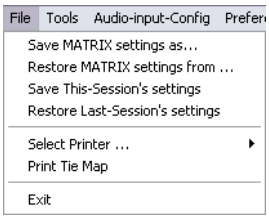
Changes – Take — Allows you to save to file any changes made to the displayed configuration.

Changes – Cancel — Returns to the previous screen, undoing any changes you have made.

Trash can — Drag and drop from an input or output button to the trash can to clear all ties associated with that input or output.

WCP Windows menus

WCP File menu



Save matrix settings as ... — Saves a complete set of up to 32 presets, plus the last active setting (preset #0), to a file. Saved settings include audio gain settings (if specified), assigned icons, and icon captions.

Restore matrix settings from ... — Loads and activates a previously saved setting file.

Save this-session's settings — Saves the current assigned icons and icon captions.

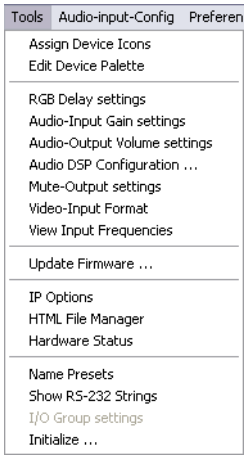
Restore last-session's settings — Loads the icons and icon captions that were saved during the last session. If you saved the previous session's changes to disk the last time you exited the program, the ties from that session are also loaded.

Select printer ... — Selects the target printer from a list of connected printers.

Print tie map — Prints the tie set that is displayed on the screen.

Exit — Closes the Matrix Switchers Control Program.

WCP Tools menu



Assign Device Icons — Displays the complete set of input and output device icons. You can drag any of these icons to the input and output boxes.

Edit Device Palette — Allows you to add your own device icon graphics.

RGB Delay settings — Displays the switching interval setting for each input and allows you to change them.

Audio-Input Gain settings — Displays the audio gain level setting for a single input or for all inputs and allows you to change it. The level is expressed as the amplitude (number of decibels) and polarity (positive, gain or negative, attenuation) of the audio adjustment.

NOTE *Individual controls, offering finer trim adjustments (in 0.1 dB increments) for the right and left channels and group master offsets are present in the DSP (see "DSP Configurator Program", on page 5-4). These controls are not shown in the gain display described here.*

Audio-Output Volume settings — Displays the audio output level setting for a single input or for all inputs and allows you to change it. The level is expressed as a percentage of the input audio volume that is applied to the output; 0% is full attenuation (audio is silent), 100% is full volume.

NOTE *Individual controls, offering finer trim adjustments (in 0.1 dB increments) for the right and left channels and group master offsets are present in the DSP (see "DSP Configurator Program", on page 5-4). These controls are not shown in the volume display described here.*

Audio DSP Configuration — Calls the DSP Configurator program and automatically switches to *Live* mode. See "DSP Configurator Program", on page 5-4.

Mute-Output settings — Displays the Volume and Mute Adjust screen, which allows you to mute and unmute individual or all video and/or audio outputs.

Video-Input format — Displays the Video-Input Format screen, which allows you to define inputs 11 through 14 as either S-video or composite video.

View-Input Frequencies — (DSVP) Displays the input horizontal and vertical frequencies for each computer video group input and the signal present or not present status for each low resolution video group input.

Update Firmware — Allows you to replace the firmware that is coded on the switcher's control board without taking the switcher out of service, opening the switcher enclosure, and replacing the firmware chip set. See "Update firmware" on page 5-46.

IP Options — Allows you to set IP options. See "IP Settings/Options window" on page 5-44.

HTML File Manager — Displays a list of HTML files installed on the switcher and allows you to upload custom files from a connected PC to the switcher. See "Upload HTML files" on page 5-52.

Hardware Status — Provides an overall view of the status of the matrix switcher, including the primary and secondary power supply status and the individual voltages, the fan and temperature status, the Remote RS-232 port configuration, and the installed and updated firmware status (figure 5-33).

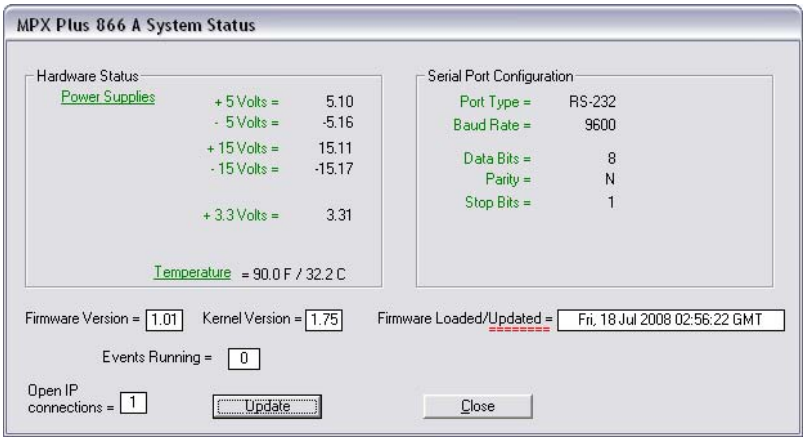

MPX Plus 866 A System Status
Hardware Status
Power Supplies
+ 5 Volts = 5.10
- 5 Volts = -5.16
+ 15 Volts = 15.11
- 15 Volts = -15.17
+ 3.3 Volts = 3.31
Temperature = 90.0 F / 32.2 C
Serial Port Configuration
Port Type = RS-232
Baud Rate = 9600
Data Bits = 8
Parity = N
Stop Bits = 1
Firmware Version = 1.01
Kernel Version = 1.75
Firmware Loaded/Updated = Fri, 18 Jul 2008 02:56:22 GMT
Events Running = 0
Open IP connections = 1
Update
Close

Figure 5-33 — Status window

Name Presets — Allows you to assign a name to each of the 32 memory presets.

NOTE *Preset names are limited to 12 upper- and lower-case alphanumeric characters, space, and the _ : = and / characters.*

NOTE *The following characters are invalid in preset names: + ~ , @ = ' [ ] { } < > ' " ; : \| \ and ?.*

Show RS-232 Strings — Displays the ASCII commands that are used by the current configuration. You can refer to these for RS-232 programming.

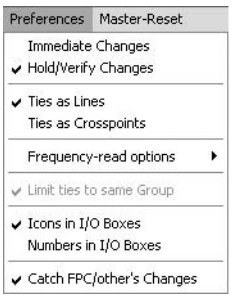
Initialize — Initializes and clears any or all of the following: ties, presets, audio configuration, preset names, icon names, and icons.

WCP Audio-input Configuration menu bar selection

Audio-input-Config

Displays the audio gain level setting for a single input or for all inputs and allows you to change it. The level is expressed as the magnitude (number of decibels) and polarity (positive, gain or negative, attenuation) of the audio adjustment.

WCP Preferences menu



Immediate Changes — Causes configuration changes to take effect immediately.

Hold/Verify Changes — Delays implementation of configuration changes until the Changes – Take button is pressed.

Ties as Lines — Displays ties as lines (figure 5-34).

Figure 5-34 — Ties shown as lines

Ties as Crosspoints — Displays ties as a matrix of inputs and outputs (figure 5-35). Ties that have been made are indicated as **amber** (video and audio), **green** (video only), and **red** (audio only) boxes. Ties that will take effect when you click on the **Take** button are indicated by +. Ties that will be broken when you click on the **Take** button are indicated by –.

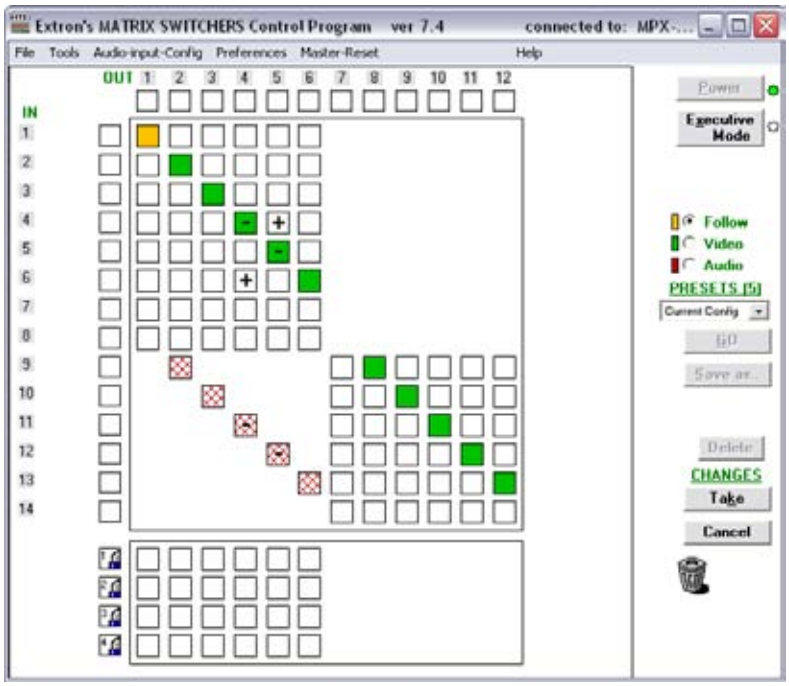
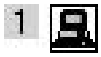


Figure 5-35 — Ties shown as crosspoints

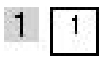
Frequency read options (computer video inputs only) **—** Allows you to set the input signal detection (DSVP) feature as follows:

- To never sample and display the sync or no sync status (set this option to **None**)
- To automatically refresh the display (set this option to **Automatically every 10 seconds**)
- To sample the sync and update the display whenever you make a configuration change (set this option to **On demand or by refresh**).

Icons in I/O Boxes — Erases any numbers in the I/O boxes in the Control Program window (figure 5-25). You can place icons in the boxes.



Numbers in I/O Boxes — Erases any icons in the I/O boxes in the Control Program window and fills each box with the associated input or output number.



Catch FPC/other's Changes — When checked, sets the switcher to report all configuration and setting changes to the Remote RS-232 or Ethernet connection that turned this selection on. These reports allow the Matrix Switchers Control Program to track the changes that occur in the switcher's configuration and settings, whether commanded via the front panel, the RS-232 port, or the Ethernet port.

WCP Master-Reset menu bar selection

Master reset clears all ties and presets, all video and audio mutes, sets all input audio levels to unity gain (+0 dB), sets all output volume levels to 100% (0 dB of attenuation), and clears the entire DSP configuration.

NOTE *Master reset does not reset the Internet protocol (IP) settings.*

Using Emulate mode

Emulate mode allows you to set up the software without connecting a switcher to the computer. To use Emulate mode, do the following:

1. Double-click the Matrix Switchers Control Program icon in the Extron Electronics group or folder.
2. Choose Emulate, and click **Ok**.
3. Choose an emulation file to open, and click **Ok**. The file DEMO.MTX provides a sample of a completed matrix setup. Selecting the file NEW.INI or clicking **Cancel** provides a blank setup to get you started.
4. Enter the file name under which you want to save any changes to the file, and click **Ok**.
5. Select the number of video boards, audio boards, and matrix model for which you are preparing a configuration, and click **Ok**.
6. Continue using the program as described on page 5-42.

Using the help system

For information about program features, you can access the help program in any of the following ways:

- From the Extron Electronics program folder or group, double-click on the Matrix Switcher Help icon (shown at right).
- From within the Matrix Switchers Control Program, click on the Help menu on the main screen.
- From within the Matrix Switchers Control Program, press the F1 key.

Special Characters

The HTML language reserves certain characters for specific functions. The switcher will not accept these characters as part of preset names, the switcher's name, passwords, or locally created file names.

The switcher rejects the following characters:
{space (spaces **are** ok for names)} + ~ , @ = ‘ [ ] { } < > ’ “ semicolon (;) colon (:) | \ and ?.

Button-Label Generator Program

The Button Label Generator software creates labels that you can place in the translucent covers of the input and output selection buttons. You can create labels with names, alphanumeric characters, or even color bitmaps for easy and intuitive input and output selection. See appendix C, “Reference Information”, for the procedure for removing and replacing the translucent covers.

The Extron Button Label Generator is available on the Extron Web site, www.extron.com, under the Download Center tab. Click the Software link (figure 5-36), and download and install the program.

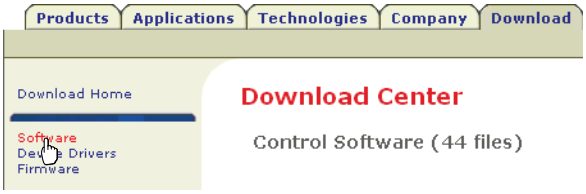


Figure 5-36 — Location of software on the web site

NOTE *The Button Label Generator software is also included on the Extron Software Products Disk that accompanies the switcher.*

By default, the installation creates a C:\Program Files\Extron\ ButtonLabelGenerator directory and places the Button Label Generator icon into a group or folder named "Extron Electronics".

Using the Button-Label Generator software

1. To run the Button-Label Generator program, click **Start** > **Programs** > **Extron Electronics** > **Button Label Generator** > **Button Label Generator**. The Button-Label Generator window appears (figure 5-37).
2. In the Systems selection box, choose the Matrix Switchers 1616 option to match the button label size and quantities for your MPX switcher.
3. Using standard Windows controls, you can create and print labels that can be placed in the label windows on the front panel of the switcher.

NOTE *For best results, print on transparent or translucent material.*

4. Click the **Clear All Buttons** button and create new labels as many times as necessary to make all of the button labels that you need.

To access the help program, click the **Help** menu.

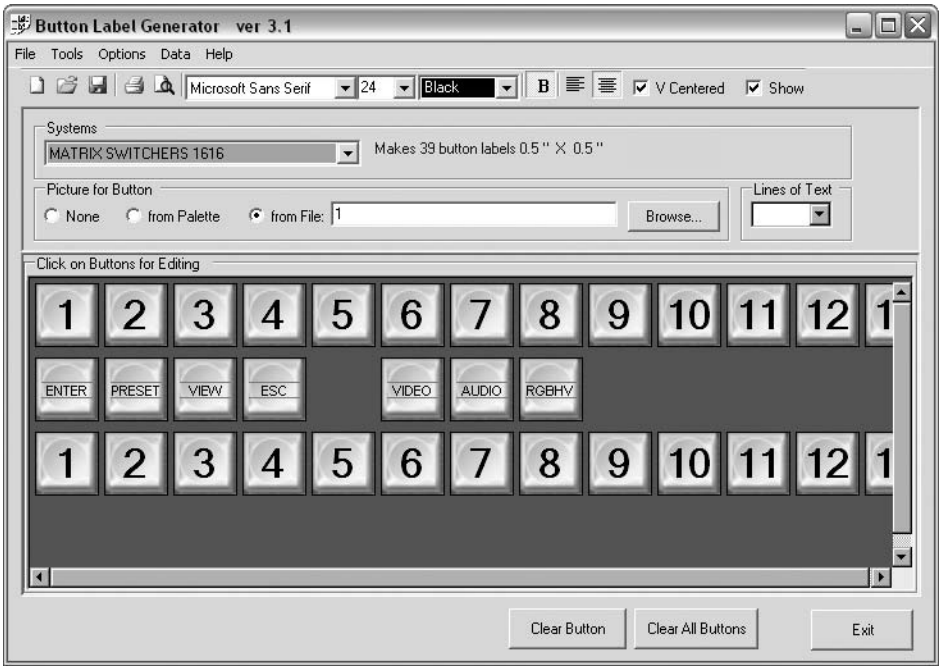


Figure 5-37 — Extron Button-Label Generator window

6

Chapter 6

HTML Operation

Download the Startup Page

Status Tab

Configuration Tab

File Management Tab

Control Tab

Special Characters

HTML Operation

The switcher can be controlled and operated through its Ethernet port, connected via a LAN or WAN, using a web browser such as the Microsoft® Internet Explorer®. The browser's display of the switcher's status or operation has the appearance of web pages. This chapter describes the factory-installed HTML pages, which are always available and cannot be erased or overwritten.

NOTE *If your Ethernet connection to the matrix switcher is unstable, try turning off the proxy server in your Web browser. In Microsoft Internet Explorer, click* **Tools** > **Internet Options** > **Connections** > **LAN Settings**, *uncheck the "***Use a proxy server...***" box, and then click* **Ok**.

Download the Startup Page

Access the switcher using HTML pages as follows:

1. Start the Web browser program.
2. Click in the browser's Address field.
3. Enter the switcher's IP address in the browser's Address field.

NOTE *If the local system administrators have not changed the value, the factory-specified default, 192.168.254.254, is the correct value for this field.*

4. If you want the browser to display a page other than the default page (such as a custom page that you have uploaded), enter a slash (/) and the file name to open after the IP address.

NOTE *The browser's Address field should display the address in the following format: xxx.xxx.xxx.xxx/{**optional**_file_name.html}*

NOTE *The following characters are invalid in file names: {space} + ~ , @ = ' [ ] { } < > ' " ; : \| \ and ?.*

5. Press the keyboard Enter key. The switcher checks to see if it is password protected.

   If the switcher is not password protected, it checks and downloads the HTML pages to the PC (proceed to step **7**).

   If the switcher is password protected, the computer displays the Connect To dialog box (figure 6-1).

Figure 6-1 — Connect To page

6. Click in the Password field and type in the appropriate administrator or user password. Click the **OK** button.

NOTE *A User name entry is not required.*

7. The switcher checks several possibilities, in the following order, and then responds accordingly:

   a. Does the address include a specific file name, such as 10.13.156.10/file_name.html? **If so**, the switcher downloads that HTML page to the PC.

   b. Is there a file in the switcher's memory that is named "index.html"? **If so**, the switcher downloads "index.html" as the default startup page.

   c. **If neither of the above conditions is true**, the switcher downloads the factory-installed default startup page to the PC, "nortxe_index.html" (figure 6-2), also known as the System Status page.

Status Tab

System Status page

The System Status page (figure 6-2) provides an overall view of the status of the matrix switcher, including the power supply status, the individual voltages, and the temperature. The System Status page is the default page that the switcher downloads to the PC when you connect to the switcher. Access the System Status page from other pages by clicking the **Status** tab.

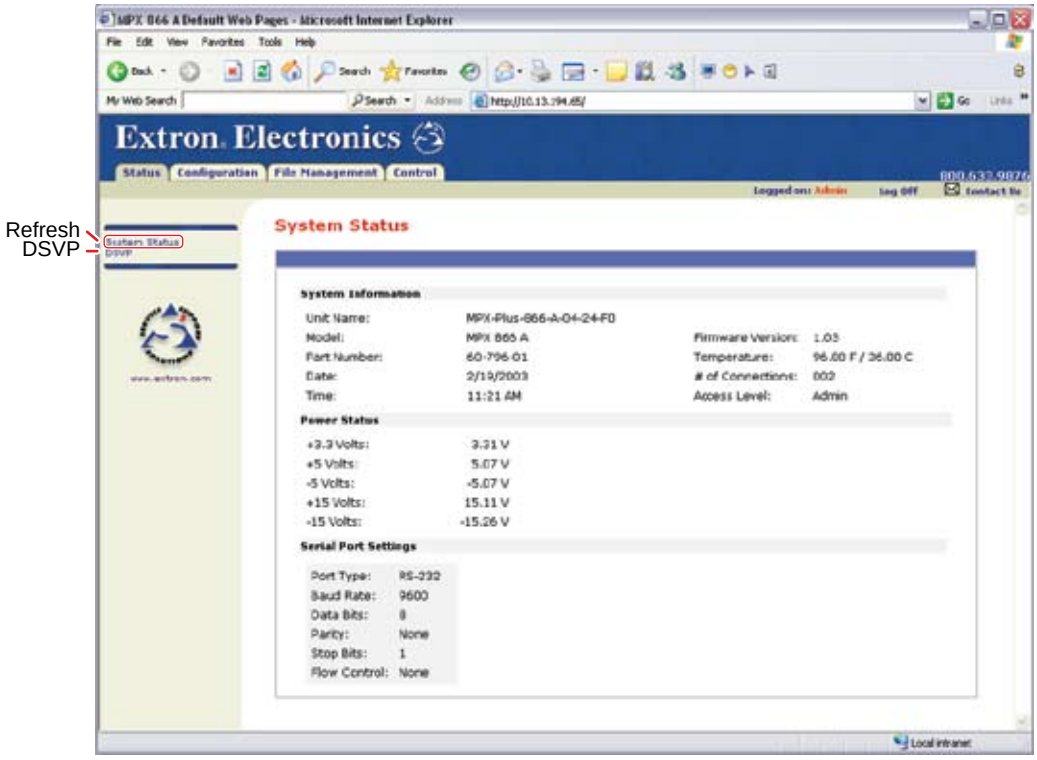


Figure 6-2 — System Status page

DSVP page

You can view a snapshot-in-time of the input frequencies of connected computer inputs and input signal status of composite video and S-video inputs on the Digital Sync Validation Processing (DSVP) page (figure 6-3). Click the DSVP link to the left of the Status page to download the DSVP page to the PC. The DSVP page automatically updates itself every 30 seconds to show the latest input frequencies or if an input has been disconnected.

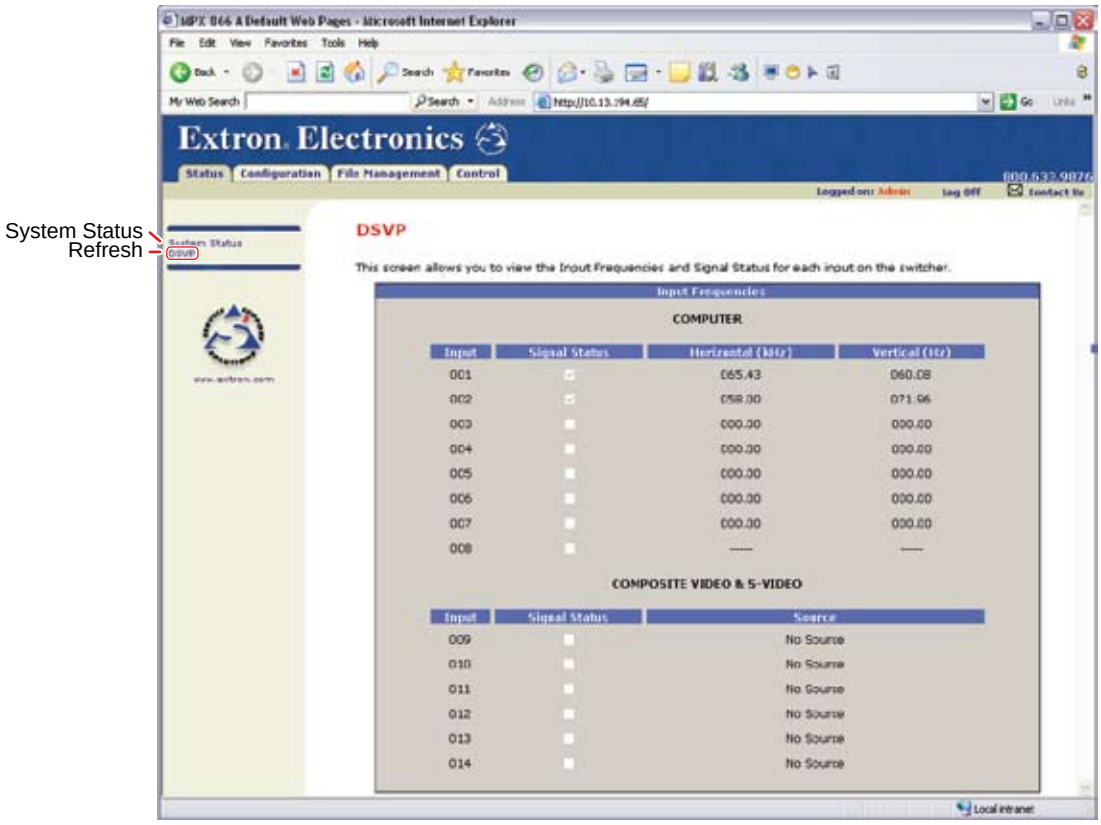


Figure 6-3 — DSVP page

Configuration Tab

System Settings page

The matrix switcher downloads the System Settings page to the PC (figure 6-4) when you click the **Configuration** tab. The screen consists of fields in which you can view and edit IP administration and system settings. The Video Input Settings, Passwords, and Firmware Upgrade pages can be accessed by clicking the appropriate link. See appendix A, "Ethernet Connection", for basic information about IP addresses and subnetting.

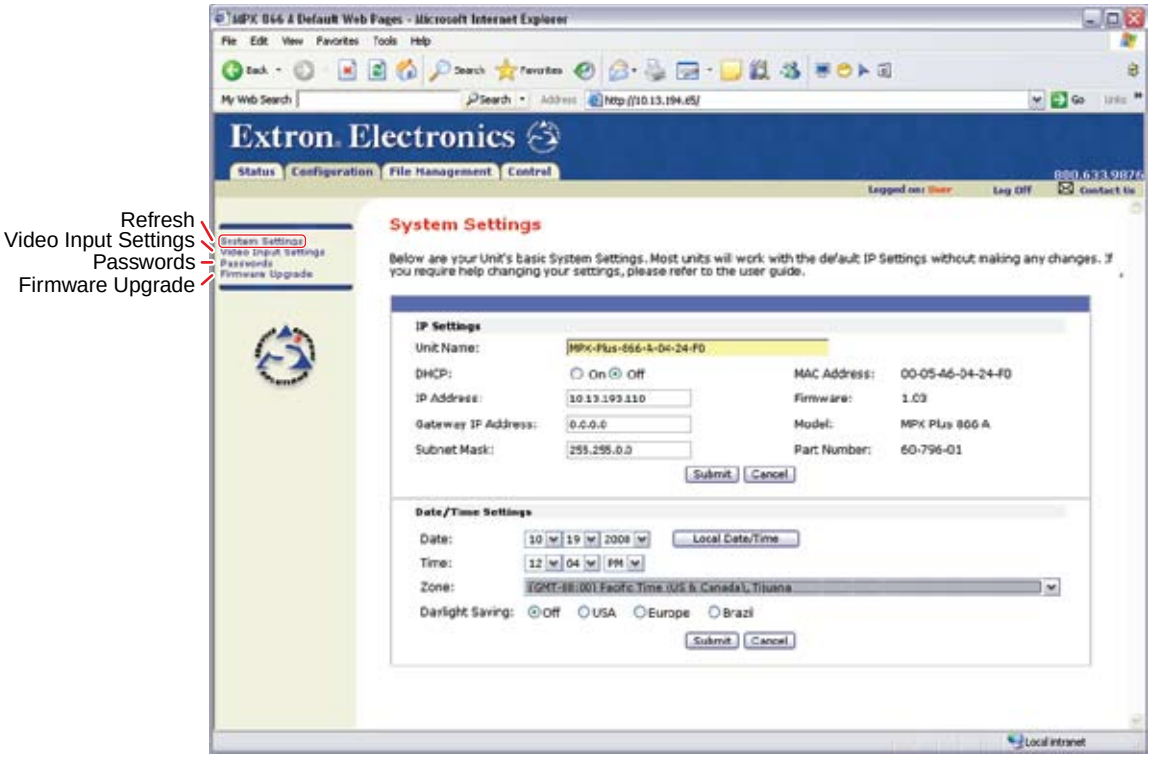


Figure 6-4 — System Settings page

On password-protected connections, there are two levels of protection: administrator and user. Administrators have full access to all switching capabilities and editing functions. Users can create ties, create and recall presets, set video and audio mutes, and view all settings except passwords.

- Ethernet connection to the switcher is password protected.
- Connection via any RS-232 port **is not** password protected.

IP Settings fields

The IP Settings fields provide a location for viewing and editing settings unique to the Ethernet interface. After editing any of the settings on this page, click the **Submit** button at the bottom of the page.

Unit Name field

The Unit Name field contains the name of the switcher. This name field can be changed to any valid name, up to 24 alphanumeric characters.

NOTE *The following characters are invalid in the matrix name: + ~ , @ = ' [ ] { } < > ' " ; : | \ and ?.*

DHCP radio buttons

The DHCP On radio button directs the switcher to ignore any entered IP addresses and to obtain its IP address from a Dynamic Host Configuration Protocol (DHCP) server (if the network is DHCP capable). The DHCP Off radio button turns DHCP off. Contact the local system administrator to determine if DHCP is appropriate.

IP Address field

The IP Address field contains the IP address of the connected switcher. This value is encoded in the switcher's flash memory.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to 3 digits total per field, are optional. Values of 256 and above are invalid.

The factory-installed default address is 192.168.254.254, but if this conflicts with other equipment at your installation, you can change the IP address to any valid value.

NOTE *IP address changes can cause conflicts with other equipment. Only local system administrators should change IP addresses.*

Gateway IP Address field

The Gateway IP Address field identifies the address of the gateway to the mail server to be used if the switcher and the mail server are not on the same subnet.

The gateway IP address has the same validity rules as the system IP address.

Subnet Mask field

The Subnet Mask field is used to determine whether the switcher is on the same subnet as the mail server when you are subnetting. For more information, see "Subnetting — A Primer", in Appendix A, "Ethernet Connection".

MAC Address field

The Media Access Control (MAC) Address (called the "hardware address" in the Matrix Switchers Control Program, chapter 5, "Switcher Software") is hardcoded in the switcher and cannot be changed.

Date/Time Settings fields

The Date/Time Settings fields (figure 6-5) provide a location for viewing and setting the time functions.

Figure 6-5 — Date/Time Settings fields

Change the date and time settings as follows:

1. Click the desired variable's drop box. The adjustable variables are month, day, year, hours, minutes, AM/PM, and (time) zone. A drop-down scroll box appears (the year drop box is selected in figure 6-5).
2. Click and drag the slider or click the scroll up button or scroll down button until the desired variable is visible.
3. Click the desired variable.

NOTE *If setting the time, set the local time. The Zone variable allows you to then select the offset from Greenwich Mean Time (GMT).*

NOTE *The Zone field identifies the standard time zone selected and displays the amount of time, in hours and minutes, that the local time varies from the GMT international time reference.*

4. Repeat steps 1 through 3 for other variables that need to be changed.
5. If appropriate, click in the **Daylight Savings** radio button to turn on the daylight savings time feature.

NOTE *When Daylight Saving Time is turned on, the switcher automatically updates its internal clock between Standard Time and Daylight Saving Time in the spring and fall on the date that the time change occurs in the country or region selected. When Daylight Saving Time is turned off, the switcher does not adjust its time reference.*

6. Click the **Submit** button.

Video Input Settings page

Access the Video Input Settings page (figure 6-6) by clicking the **Video Input Settings** link on the System Settings page.

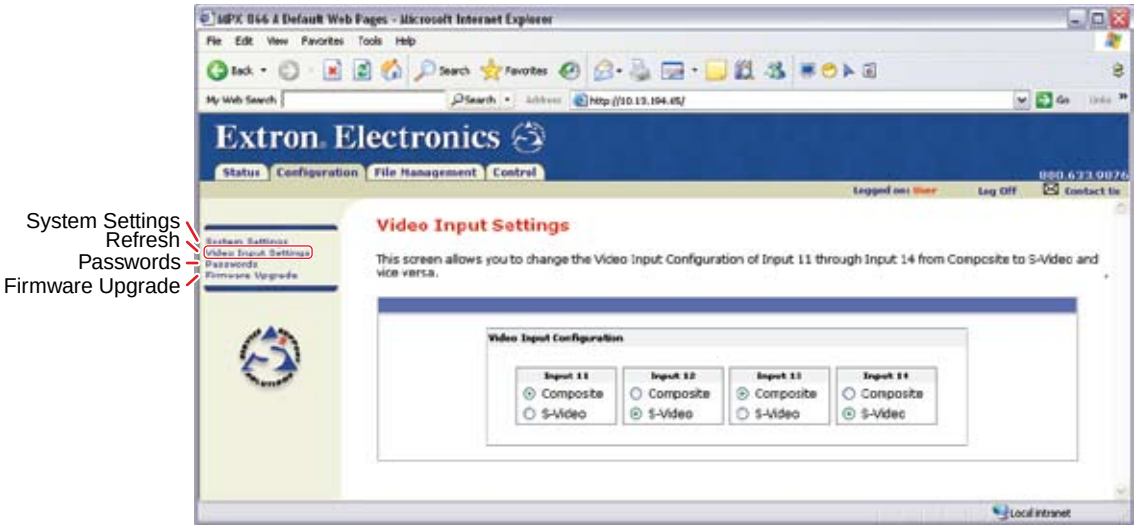


Figure 6-6 — Video Input Settings page

Low resolution video inputs 11 through 14 are individually configurable as either S-video or composite video. Click the appropriate radio button on the Video Inputs Settings page to select between S-video and composite video.

Passwords page

Access the Passwords page (figure 6-7) by clicking the **Passwords** link on the System Settings page.

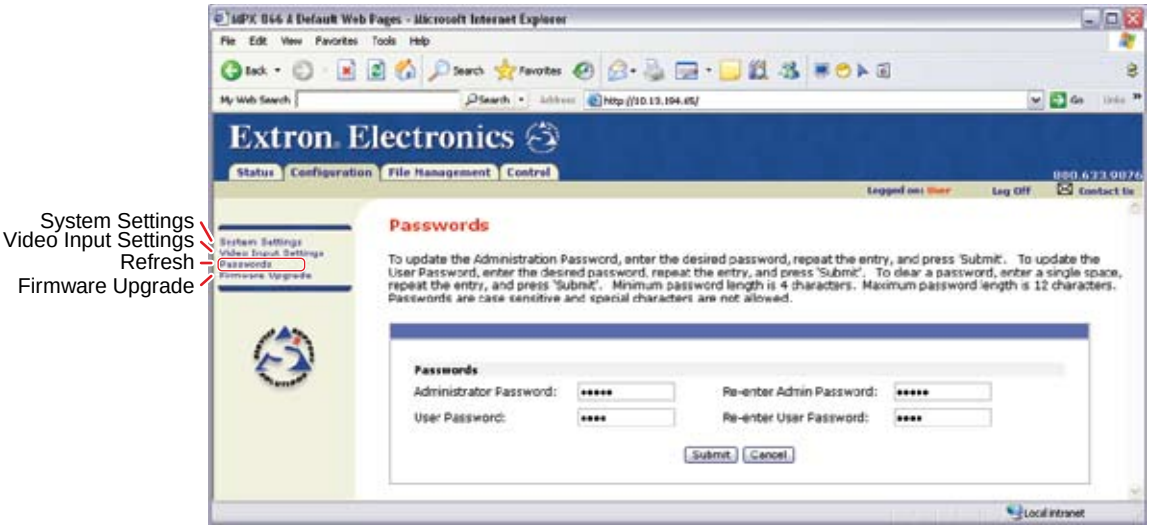

System Settings
Video Input Settings
Refresh
Firmware Upgrade
Extron Electronics
Status
Configuration
File Management
Control
Passwords
To update the Administration Password, enter the desired password, repeat the entry, and press 'Submit'. To update the User Password, enter the desired password, repeat the entry, and press 'Submit'. To clear a password, enter a single space, repeat the entry, and press 'Submit'. Minimum password length is 4 characters. Maximum password length is 12 characters. Passwords are case sensitive and special characters are not allowed.
Passwords
Administrator Password:
Re-enter Admin Password:
User Password:
Re-enter User Password:
Submit
Cancel

Figure 6-7 — Passwords page

The fields on the Passwords page are for entering and verifying administrator and user passwords. Passwords are case sensitive and are limited to 12 upper case and lower case alphanumeric characters. Each password must be entered twice: once in the Password field and then again in the Re-enter Password field. Characters in these fields are masked by asterisks or dots (*****). If you do not want to password protect an access level, leave the Password field and the Re-Enter password field blank. After entering the desired password in both fields, click the **Submit** button.

NOTE *An administrator password must be created before a user password can be created.*

To clear an existing password so that no password is required, enter a single space in the Password and Re-enter Password fields and click the **Submit** button.

Firmware Upgrade page

The Firmware Upgrade page provides a way to replace the firmware that is coded on the switcher's control board without taking the switcher out of service. Access the Firmware Upgrade page (figure 6-8) by clicking the **Firmware Upgrade** link on the System Configuration page.

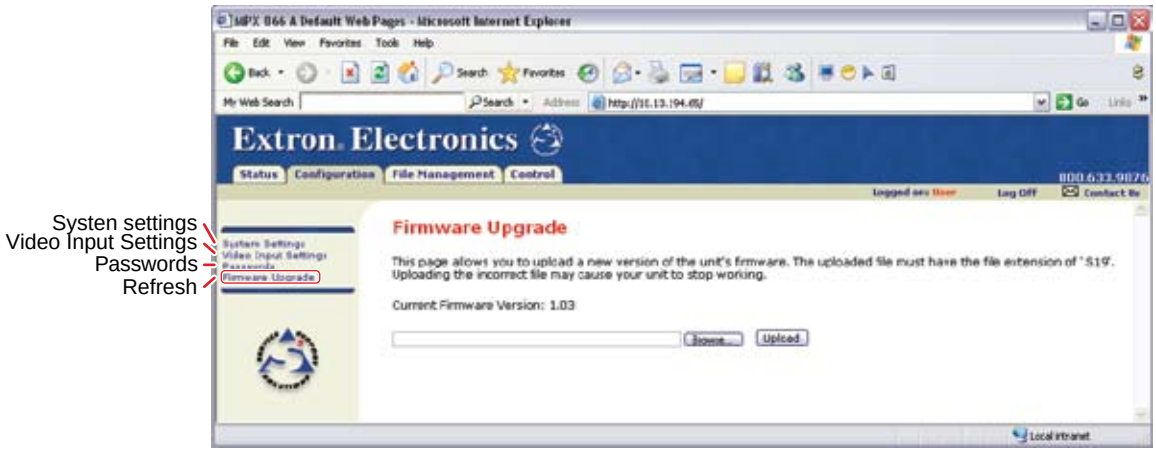

Systen settings
Video Input Settings
Passwords
Refresh
Extron Electronics
Status
Configuration
File Management
Control
Firmware Upgrade
This page allows you to upload a new version of the unit's firmware. The uploaded file must have the file extension of '.S19'. Uploading the incorrect file may cause your unit to stop working.
Current Firmware Version: 1.03
Upload

Figure 6-8 — Firmware Upgrade page

Update the switcher firmware as follows:

NOTE *The Firmware Upgrade page is **only** for replacing the firmware that controls all switcher operation. To insert your own HTML pages, see "File Management Page", on page 6-14.*

1. Visit the Extron Web site, www.extron.com, click the **Download Center** tab, and then click the **Firmware** link (figure 6-9 on the next page).
2. Select the appropriate firmware file to download and click **Download**.
3. Enter the requested personal information and then click **Download** to copy the firmware to your computer.

NOTE *The version, release date, and size shown are sample values only.*

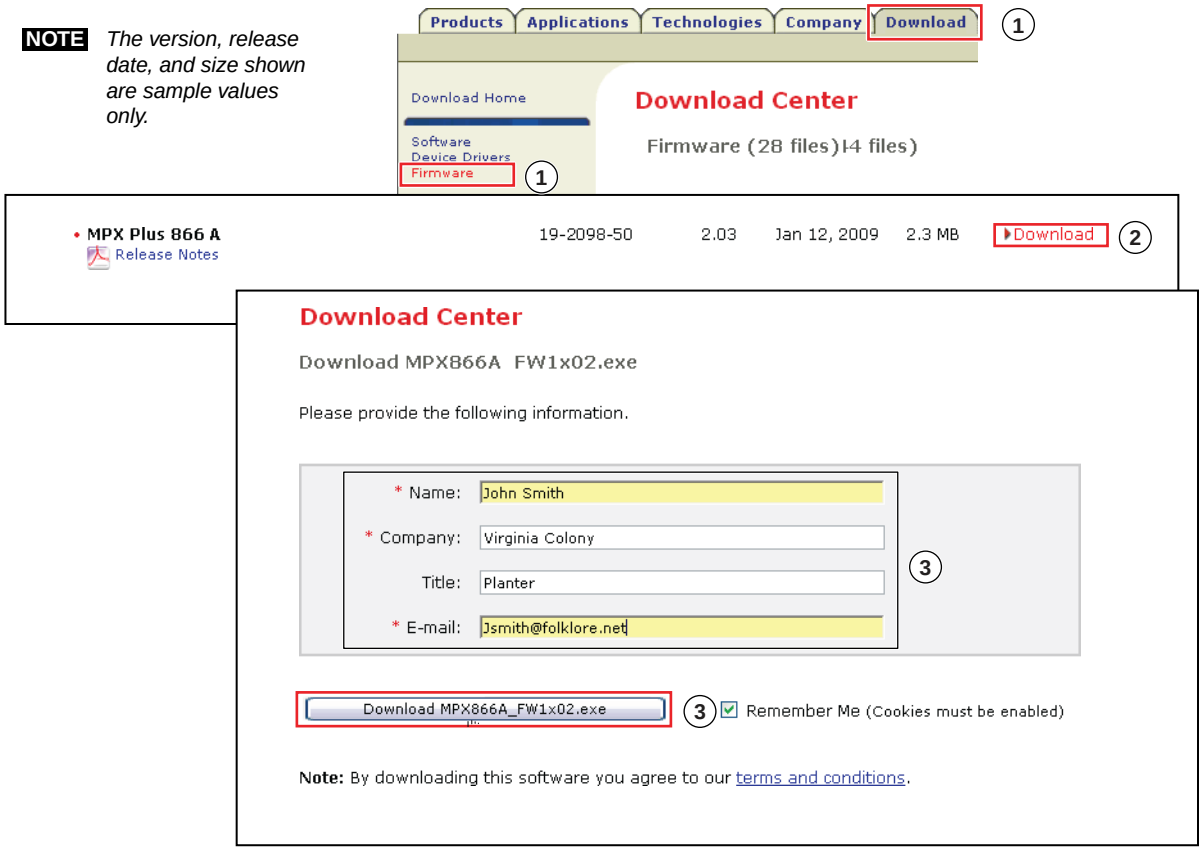
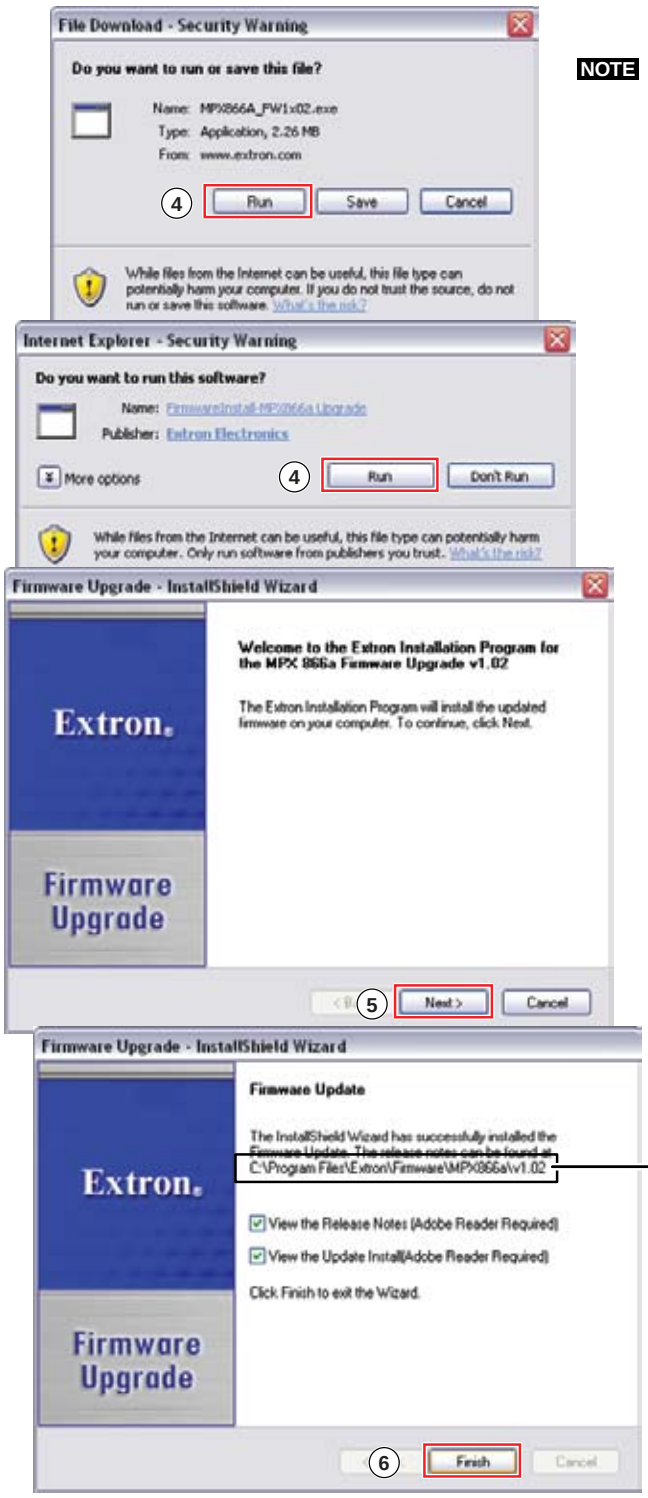


Figure 6-9 — Location of firmware upgrade files on the Web site

4. Click **Run** twice (figure 6-10). The PC downloads the firmware update from the Extron Web site and starts the Extron Installation Program to extract the firmware file.


File Download - Security Warning
Do you want to run or save this file?
Name: MPX866A_FW1x02.exe
Type: Application, 2.26 MB
From: www.extron.com
4
Run
Save
Cancel
While files from the Internet can be useful, this file type can potentially harm your computer. If you do not trust the source, do not run or save this software. What's the risk?
Internet Explorer - Security Warning
Do you want to run this software?
Name: FirmwareInstall-MPX866a Upgrade
Publisher: Extron Electronics
More options
4
Run
Don't Run
While files from the Internet can be useful, this file type can potentially harm your computer. Only run software from publishers you trust. What's the risk?
Firmware Upgrade - InstallShield Wizard
Extron
Firmware Upgrade
Welcome to the Extron Installation Program for the MPX 866a Firmware Upgrade v1.02
The Extron Installation Program will install the updated firmware on your computer. To continue, click Next.
5
Next >
Cancel
Firmware Upgrade - InstallShield Wizard
Extron
Firmware Upgrade
Firmware Update
The InstallShield Wizard has successfully installed the Firmware Update. The release notes can be found at C:\Program Files\Extron\Firmware\MPX866a\v1.02
View the Release Notes (Adobe Reader Required)
View the Update Install(Adobe Reader Required)
Click Finish to exit the Wizard.
6
Finish
Cancel

NOTE *The version shown is a sample value only.*

Folder where firmware is installed

Figure 6-10 — Downloading firmware upgrade files

5. Click **Next**. The program extracts the firmware files and places them in a folder identified in the InstallShield Wizard window.

NOTE *Note the folder to which the firmware file is saved.*

6. Click **Finish** to exit the program.
7. Connect the PC to the matrix switcher via the switcher's Ethernet port.
8. Access the matrix switcher using HTML pages.
9. Click the **Configuration** tab.
10. Click the **Firmware Upgrade** link.
11. Click the **Browse** button. An open file window appears.
12. Navigate to the folder where you saved the firmware upgrade file. Select the file.

NOTE *Valid firmware files must have the file extension '.S19'. Any other file extension is **not** a firmware upgrade.*

NOTE *The original factory-installed firmware is permanently available on the matrix switcher. If the attempted firmware upload fails for any reason, the switcher automatically reverts to the factory-installed firmware.*

13. Click the **Open** button.
14. Click the **Upload** button. The firmware upload to the switcher may take a few minutes.

File Management Tab

File Management page

To delete files such as HTML pages from the connected switcher or to upload your own files to the switcher, click the **File Management** tab. The switcher downloads the file management HTML page to the PC (figure 6-11).

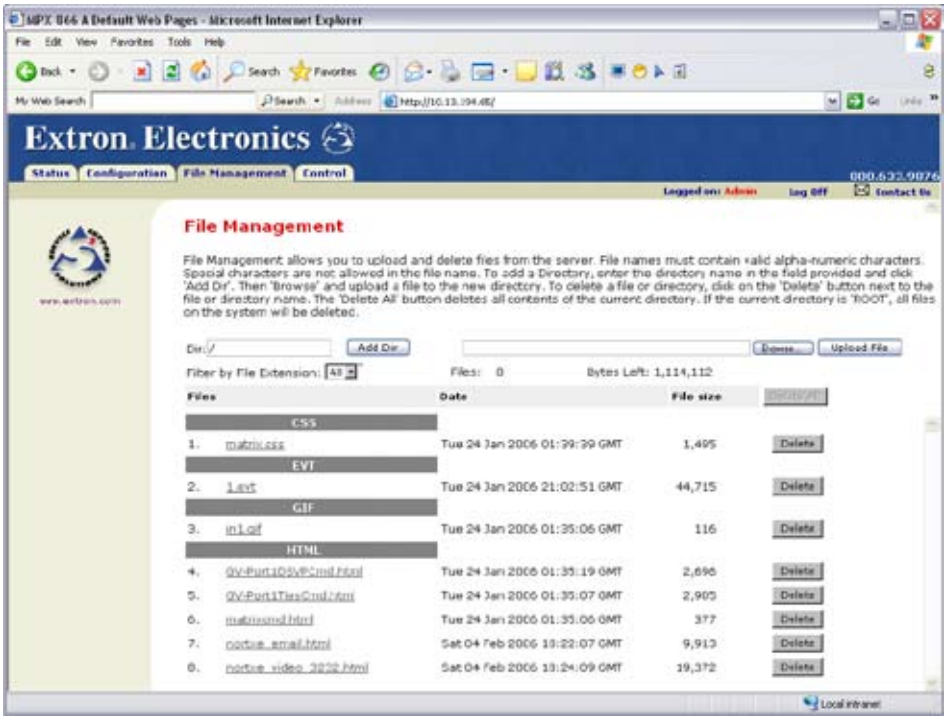


Figure 6-11 — File Management page

NOTE *The files listed in figure 6-11 are shown for example only and may not be present on your switcher.*

To delete a file, click the **Delete** button at the right of that file.

Upload your own files as follows:

NOTE *The following characters are invalid in file names: {space} + ~ , @ = ' [ ] { } < > ' " ; : \| \ and ?.*

1. Click the **Browse** button.

2. Browse through your system and select the desired file(s).

NOTE *If you want one of the pages that you create and upload to be the default startup page, name that file "index.html".*

3. Click the **Upload File** button. The file(s) that you selected appear in the list.

Control Tab

Set and View Ties page

You can create ties on the Set and View Ties page (figure 6-12). Access the Set and View Ties page by clicking the **Control** tab.

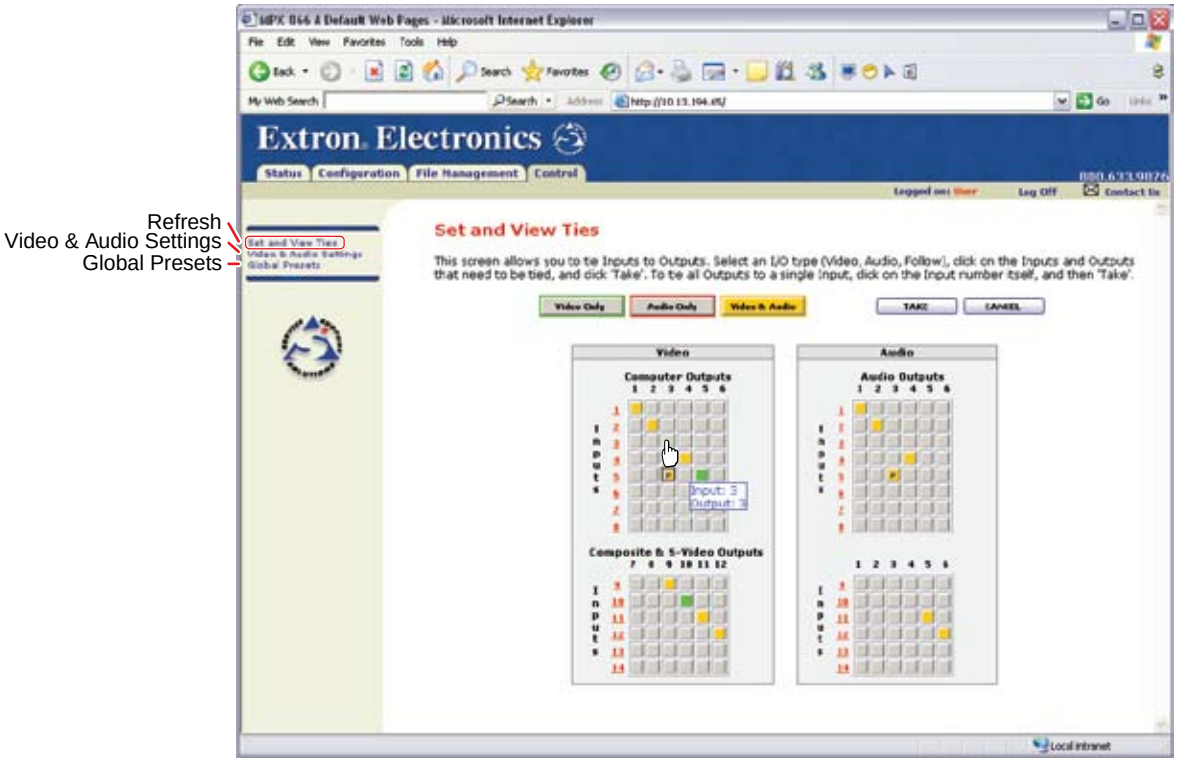


Figure 6-12 — Set and View Ties page

The page consists of a matrix of input (rows) and output (columns) selection "buttons" of four different colors, using the same color scheme as the front panel:

- The **amber** buttons indicate **video and audio ties**.
- The **green** buttons indicate **video only ties**.
- The **red** buttons indicate **audio only ties**.
- The **gray** buttons indicate **no ties**.

NOTE *If you lose track of the input and output associated with a specific button, let the mouse pointer rest over a button for a moment. As shown on figure 6-12, a field pops up that identifies the input and output for that button.*

Creating or deleting a tie

Make or break a tie as follows:

1. Click the **Video Only**, **Audio Only**, or **Video & Audio** button to select video, audio, or both for switching (audio breakaway or audio follow). Each mouse click on a button toggles the other two buttons off.
2. Move the mouse over the matrix of input and output selection buttons. Click a button to
   - Create a pending tie (if a tie does not exist) of the input and output associated with that button
   - Create pending untie (if a tie exists) of the input and output associated with that button

   A "P" (for pending) appears in the button.

NOTE *If you lose track of the input and output associated with a specific button, let the mouse rest over one of the tie buttons for a moment. A field pops up (as shown on figure 6-12) that identifies the input and output for that button.*

NOTE *To tie an input to all outputs, click that input's input number.*

3. Click the **Take** button to make the configuration changes or the **Cancel** button to abandon the configuration changes.

Video and Audio Settings page

The **Video and Audio Settings** page provides a way to set the input audio gain and attenuation, set the output volume, and mute and unmute all video and audio outputs, and (for outputs in the computer video group) set the RGB delay (switching interval). Access the **Video and Audio Settings** page (figure 6-13) by clicking the **Video & Audio Settings** link on the Set and View Ties page.

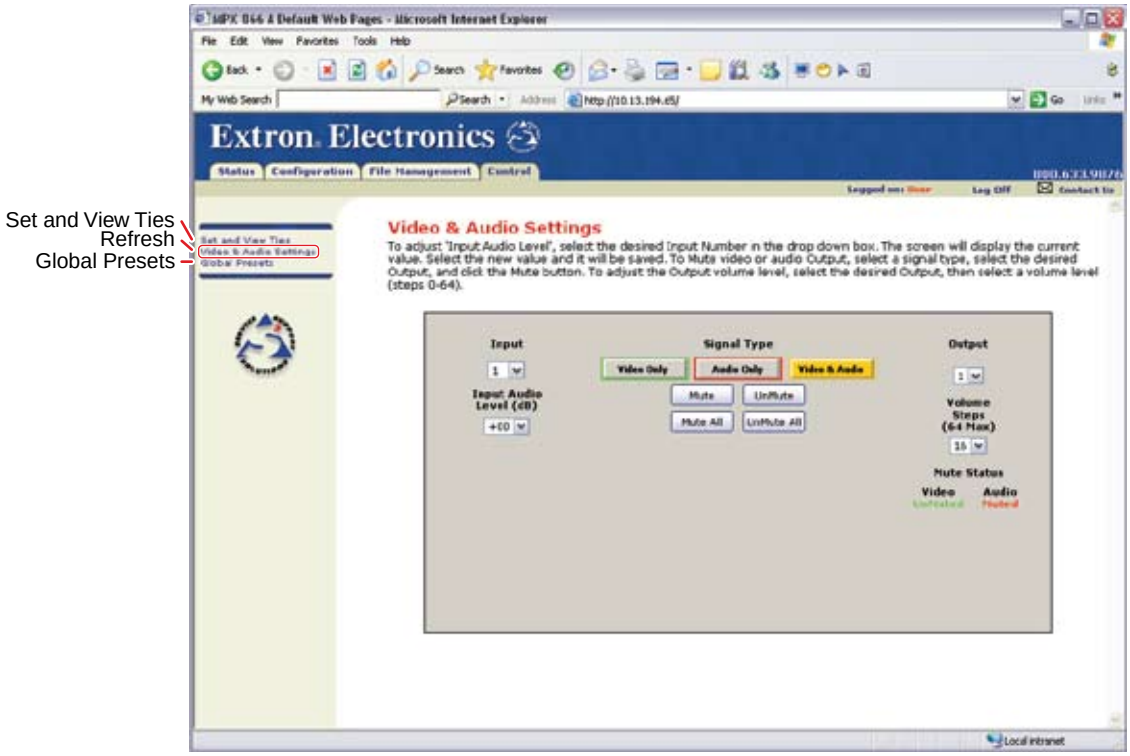


Figure 6-13 — Video and Audio Settings page

Change the input gain and attenuation

Users can set each input's level of audio gain or attenuation (-18 dB to +24 dB) from the Video and Audio Settings page. Adjustment ensures there are no noticeable volume differences between sources.

Change an input's audio level setting as follows:

1. Click the Input drop box. A drop-down box appears (figure 6-14).

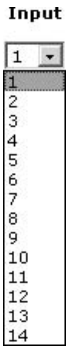


Figure 6-14 — Input selection drop box

2. Click the desired input.
3. Click the Input Audio Level (dB) drop box. A drop-down scroll box appears (figure 6-15).

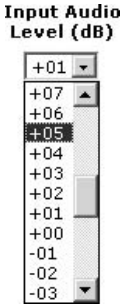


Figure 6-15 — Gain drop box

NOTE *Individual controls, offering finer trim adjustments (in 0.1 dB increments) for the right and left channels and group master offsets are present in the DSP (see "DSP Configurator Program", in chapter 5, "Switcher Software"). These controls are not shown in the gain display shown in figure 6-15.*

4. Click and drag the slider or click the scroll up button or scroll down button until the desired audio level is visible.
5. Click the desired gain or attenuation value.

Mute and unmute one or all outputs

Mute one or all outputs as follows:

1. **To select an individual output to mute or unmute**, click the Output drop box. A drop-down box appears (figure 6-16).

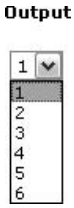


Figure 6-16 — Output selection drop box

2. Click the desired output.
3. Click the **Video Only**, **Audio Only**, or **Video and Audio** button to select video, audio, or both for muting. Each mouse click on a button toggles the other two buttons off.
4. Click the **Mute** or **UnMute** button to mute or unmute the selected output.

   Click the **Mute All** or **UnMute All** to mute or unmute all of the outputs.

   Observe the Mute status indications on the page (figure 6-17). Unmuted is displayed in green and muted is displayed in red.

Figure 6-17 — Mute status indications

Change the RGB delay (computer group video outputs only

The RGB delay interval defines how long the screen is blanked when switching to a new input for the selected output.

Change the RGB delay as follows:

1. Click the Output drop box. A drop-down box appears (figure 6-18).

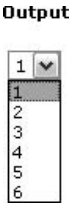


Figure 6-18 — Output selection drop box

2. Click the desired output.
3. Click the RGB delay drop box. A drop-down box appears (figure 6-19).

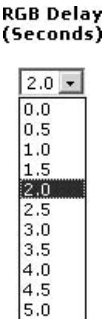


Figure 6-19 — RGB delay drop box

4. Click the desired RGB delay.

Change the output volume level

Users can set each output's volume level through a range of zero steps of attenuation (full attenuation, minimum volume) to 64 steps of attenuation (no attenuation, full volume) from the Video and Audio Settings page.

Change an output's audio level setting as follows:

1. Click the output drop box. A drop-down box appears (figure 6-20).

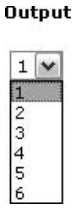


Figure 6-20 — Output selection drop box

2. Click the desired output.
3. Click the Volume Steps (64 Max) drop box. A drop-down scroll box appears (figure 6-21).

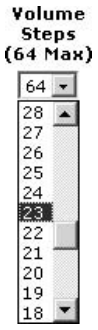


Figure 6-21 — Volume drop box

NOTE *Individual controls, offering finer trim adjustments (in 0.1 dB increments) for the right and left channels and group master offsets are present in the DSP (see "DSP Configurator Program", in chapter 5, "Switcher Software"). These controls are not shown in the volume display shown in figure 6-21.*

4. Click the desired output volume step value.

NOTE *The table on the next page defines the value of each audio volume step.*

Audio volume adjustment settings

Number of steps	dB of attenuation	Output volume	Number of steps	dB of attenuation	Output volume	Number of steps	dB of attenuation	Output volume
00	100	0%						
01	63	5.5%	23	41	38.5%	45	19	71.5%
02	62	7%	24	40	40%	46	18	73%
03	61	8.5%	25	39	41.5%	47	17	74.5%
04	60	10%	26	38	43%	48	16	76%
05	59	11.5%	27	37	44.5%	49	15	77.5%
06	58	13%	28	36	46%	50	14	79%
07	57	14.5%	29	35	47.5%	51	13	80.5%
08	56	16%	30	34	49%	52	12	82%
09	55	17.5%	31	33	50.5%	53	11	83.5%
10	54	19%	32	32	52%	54	10	85%
11	53	20.5%	33	31	53.5%	55	9	86.5%
12	52	22%	34	30	55%	56	8	88%
13	51	23.5%	35	29	56.5%	57	7	89.5%
14	50	25%	36	28	58%	58	6	91%
15	49	26.5%	37	27	59.5%	59	5	92.5%
16	48	28%	38	26	61%	60	4	94%
17	47	29.5%	39	25	62.5%	61	3	95.5%
18	46	31%	40	24	64%	62	2	97%
19	45	32.5%	41	23	65.5%	63	1	98.5%
20	44	34%	42	22	67%	64	0	100%
21	43	35.5%	43	21	68.5%			
22	42	37%	44	20	70%			

Global Presets page

You can save global ties presets and recall global tie presets and partial presets from the Global Presets page (figure 6-22). Access the Global Presets page by clicking the **Global Presets** link on the left of the Control page.

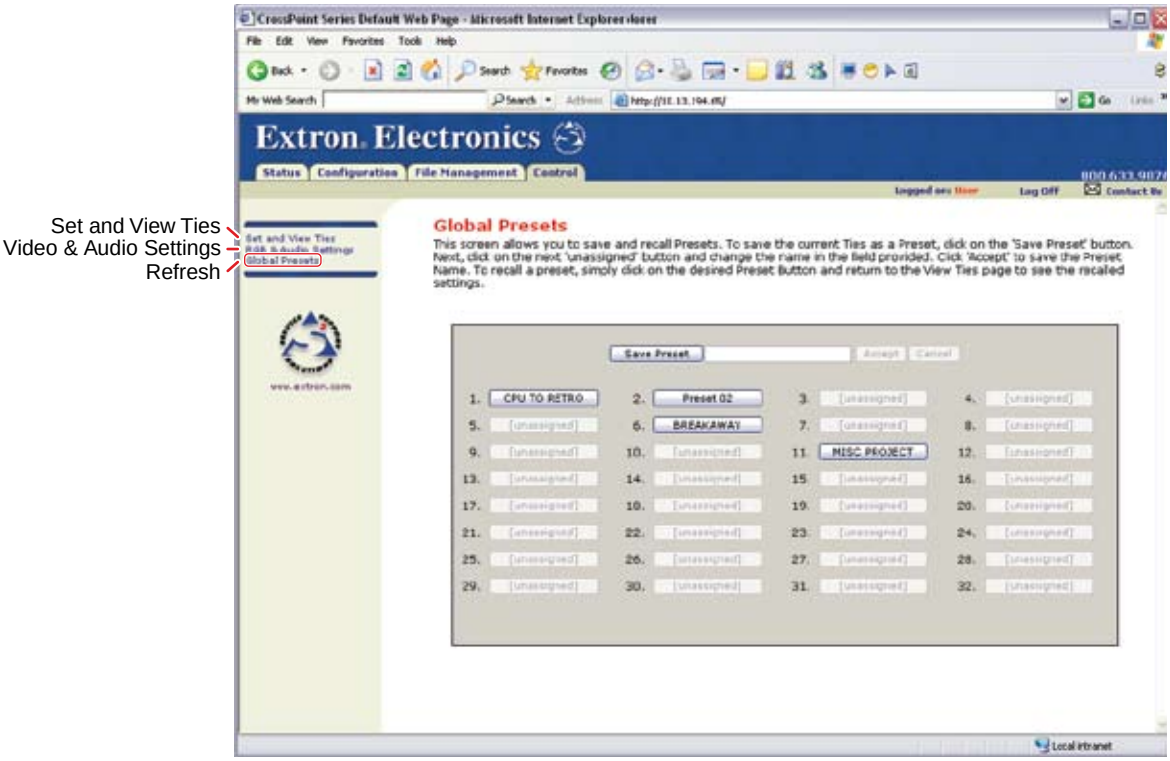

Set and View Ties
Video & Audio Settings
Refresh
Extron Electronics
Status
Configuration
File Management
Control
Global Presets
This screen allows you to save and recall Presets. To save the current Ties as a Preset, click on the 'Save Preset' button. Next, click on the next 'unassigned' button and change the name in the field provided. Click 'Accept' to save the Preset Name. To recall a preset, simply click on the desired Preset Button and return to the View Ties page to see the recalled settings.
Save Preset
1. CPU TO RETRO
2. Preset 02
6. BREAKAWAY
11. MISC PROJECT

Figure 6-22 — Global Presets page

Save a preset

NOTE *When presets are **saved** via the HTML page, only the audio and video ties are stored; audio gain settings are not saved.*

Save the current configuration (configuration 0) as a global ties preset as follows:

1. Click the **Save Preset** button.
2. Select the desired preset by clicking on one of the presets listed. To create a new preset, click one of the *[unassigned]* buttons. Overwrite an existing preset by clicking an already existing preset.
3. If desired, type over the current name in the box adjacent to the *Save Preset* button.

NOTE *Preset names are limited to 12 upper and lower case alphanumeric characters and the {space} _ : = and / characters.*

NOTE *The following characters are invalid in preset names:*
+ ~ , @ = ' [ ] { } < > ' " ; : | \ and ?.

If you do not rename an unassigned button, the matrix switcher automatically names the preset as Preset {next available number}.

If you do not rename an existing preset when it is overwritten, the matrix switcher retains the same name.

4. Click the **Accept** button.

Recall a preset

NOTE

- *When presets are **recalled** via the HTML page, any signal processing adjustments that were saved as part of the preset (under DSP Configurator control only) are recalled and overwrite the current audio settings.*
- *When a global ties preset is recalled, it replaces the current configuration, which is lost unless it is also stored as a preset. The recalled preset overwrites all of the current configuration ties in favor of the preset configuration ties.*
- *When a partial preset is recalled, it overwrites that portion of the current configuration addressed by the preset, leaving the rest unchanged.*

To recall a preset to be the current configuration, click the button associated with the desired preset.

Special Characters

The HTML language reserves certain characters for specific functions. The switcher will not accept these characters as part of preset names, the switcher's name, passwords, or locally created file names.

The switcher rejects the following characters:
{space} + ~ , @ = ‘ [ ] { } < > ’ “ semicolon (;) colon (:) | \ and ?.

Appendix A

Ethernet Connection

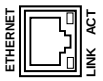
Ethernet Link

Subnetting — A Primer

Ethernet Connection

Ethernet Link

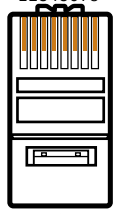
The rear panel Ethernet connector on the switcher can be connected to an Ethernet LAN or WAN. This connection makes SIS control of the switcher possible using a computer connected to the same LAN.



Ethernet connection

The Ethernet cable can be terminated as a straight-through cable or a crossover cable and must be properly terminated for your application (figure A-1).

- **Crossover cable** — Direct connection between the computer and the switcher
- **Patch (straight-through) cable** — Connection of the switcher to an Ethernet LAN



Crossover Cable

Pin	End 1 Wire color	End 2 Wire color
1	White-green	White-orange
2	Green	Orange
3	White-orange	White-green
4	Blue	Blue
5	White-blue	White-blue
6	Orange	Green
7	White-brown	White-brown
8	Brown	Brown
	T568A	T568B

A cable that is wired as T568A at one end and T568B at the other (Tx and Rx pairs reversed) is a "crossover" cable.

Straight-through Cable

Pin	End 1 Wire color	End 2 Wire color
1	White-orange	White-orange
2	Orange	Orange
3	White-green	White-green
4	Blue	Blue
5	White-blue	White-blue
6	Green	Green
7	White-brown	White-brown
8	Brown	Brown
	T568B	T568B

A cable wired the same at both ends is called a "straight-through" cable, because no pin/pair assignments are swapped.

Figure A-1 — RJ-45 connector pinout tables

Default address

To access the switcher via the LAN port, you need the switcher's IP address. If the address has been changed to an address comprised of words and characters, you can determine the actual numeric IP address using the Ping utility. If the address has not been changed, the factory-specified default is 192.168.254.254.

Ping can also be used to test the Ethernet link to the switcher.

Pinging to determine Extron IP address

The ping utility is available at the DOS prompt. Ping tests the Ethernet interface between the computer and the switcher. Ping can also be used to determine the actual numeric IP address from an alias and to determine the web address.

Ping the switcher as follows:

1. On the Windows task bar, click **Start** > **Run**.
2. At the Open prompt, type *command*.
3. Click the **OK** button.
4. At the DOS prompt, type *ping {IP address}* and then press [Enter]. The computer returns a display similar to figure A-2.

   The line **Pinging ...** reports the actual numeric IP address, regardless of whether you entered the actual numeric IP address or an alias name.

```
C:\>ping 192.168.254.254

Pinging 192.168.254.254 with 32 bytes of data:

Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128

Ping statistics for 192.168.254.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Figure A-2 — Ping response

Pinging to determine Web IP address

The ping utility has a modifier, *-a*, that directs the command to return the Web address rather than the numeric IP address.

At the DOS prompt, type *ping -a {IP address}* and then press [Enter]. The computer's return display is similar to the ping response shown in figure A-2, except that when you specify the *-a* modifier, the line **Pinging mail...** reports the web IP address rather than the numeric IP address, regardless of whether you entered the actual numeric IP address or an alias name.

Connecting as a Telnet client

The Microsoft Telnet utility is available from the command prompt. Telnet lets you input SIS commands to the switcher from the PC via the Ethernet link and the LAN.

Access the command prompt and start Telnet as follows:

1. On the Windows task bar, click on **Start** > **Run**.
2. At the Open prompt, type *command*.
3. Click the **OK** button.
4. At the prompt, type *telnet* and then press [Enter]. The computer returns a display similar to figure A-3.

```
Microsoft (R) windows 2000 (TM) Version 5.0 (Build 2195)
Welcome to Microsoft Telnet Client
Telnet Client Build 5.00.99203.1

Escape Character is 'CTRL+]'

Microsoft Telnet>
```

Figure A-3 — Telnet screen

Telnet tips

It is not the intention of this manual to detail all of the operations and functionality of Telnet; however, some basic level of understanding is necessary for operating the switcher via Telnet.

Open

Connect to the switcher using the Open command. Once you are connected to the switcher, you can enter the SIS commands the same as you would if you were using the RS-232 link.

Connect to the switcher as follows:

1. At the Telnet prompt, type *open {IP address}* and then press [Enter].

   If the switcher is not password protected, no further prompts are displayed until you break or disconnect the connection to the switcher.

   If the switcher is password protected, Telnet displays the password prompt.

2. If necessary, at the password prompt, type *{password}* and then press [Enter].

   Connection to the switcher via the Ethernet can be password protected. There are two levels of password protection: administrator and user. A person logged on as an administrator has full access to all switching capabilities and editing functions. Users can select video and/or audio for output, select test patterns, set audio or RS-232 mutes, select a blue screen, and view all settings with the exception of passwords. By default, the switcher ships with both passwords set to {carriage return}.

   Once you are logged in, the switcher returns either **Login Administrator** or **Login User**. No further prompts are displayed until you break or disconnect the connection to the switcher.

Escape character and Esc key

When Telnet is first started, the utility advises that the **Escape character is 'Ctrl+]'**. Many SIS commands include the keyboard Esc key. Consequently, some confusion may exist between the Escape character and the Escape key.

The Telnet escape character is a key combination, the Ctrl key and the] key pressed simultaneously, that returns you to the Telnet prompt while leaving the connection to the switcher intact.

The Escape key is the Esc key on the computer keyboard.

Local echo

Once connected to the switcher, by default, Telnet does not display your keystrokes on the screen. SIS commands are typed in blindly and only the SIS responses are displayed on the screen. To command Telnet to show keystrokes, at the Telnet prompt, type *set local_echo* and then press [Enter] before you open the connection to the switcher.

With local echo turned on, keystrokes and the switcher's responses are displayed on the same line. For example: **1*1!In1 Out1 All,** where **1*1!** is the SIS command and **In1 Out1 All** is the response.

With local echo turned on, all keystrokes are displayed, even those that should be masked, such as the password entry. For example, when entering a password with local echo turned on, you see a display such as **a*d*m*i*n***, where **admin** is the keyed in password and ***** is the masked response.

You can turn off local echo by typing *unset local_echo* and then pressing [Enter] at the Telnet prompt. If you are connected to the switcher and need to access the Telnet prompt to turn local echo off, type the Escape character (Ctrl+]).

Set carriage return-line feed

Unless commanded otherwise, Telnet transmits a line feed character only (no carriage return) to the connected switcher when you press the Enter key. This is the correct setting for SIS communication with the switcher. The Telnet *set crlf* command forces Telnet to transmit carriage return and line feed characters when Enter is pressed, but if crlf is set, the SIS link with the switcher does not function properly.

Close

To close the link to the switcher, access the Telnet prompt by typing the Escape character (Ctrl+]). At the Telnet prompt, type *close* and then press [Enter].

Help

For Telnet command definitions, at the Telnet prompt, type *?* and then press [Enter].

Quit

Exit the Telnet utility by typing *quit* and then pressing [Enter] at the Telnet prompt. If you are connected to the switcher, access the Telnet prompt by typing the Escape character (Ctrl+]).

Subnetting — A Primer

It is not the purpose of this manual to describe TCP/IP protocol in detail. However, some understanding of TCP/IP subnetting (a subnet is a **sub**set of a **net**work — a set of IP devices that have portions of their IP addresses in common) is necessary in order to understand the interaction of the switcher and the mail server gateway. To understand subnetting at the level required to install and operate the switcher, you must understand the concepts of a gateway, local and remote devices, IP addresses and octets, and subnet masks and octets.

Gateways

The switcher can communicate with the e-mail server that the switcher uses for e-mail notification directly (if they are on the same subnet) or the communication can be routed via a gateway (a computer that provides a link between different subnets).

Local and remote devices

The local and remote devices are defined from the point of view of the function being described. In this manual, subnetting is an issue when you are using the controlling PC to set TCP/IP values in the switcher (see "IP Settings/Options window" in chapter 5, "Switcher Software", and "System Settings page" in chapter 6, "HTML Operation").

IP addresses and octets

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields, properly called octets, separated by dots (periods) (figure A-4). Each octet can be numbered from 000 through 255. Leading zeroes, up to three digits total per octet, are optional. Values of 256 and above are invalid.

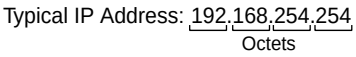


Figure A-4 — IP address and octets

Subnet masks and octets

The subnet mask (figure A-5) is used to determine whether the local and remote devices are on the same subnet or different subnets. The subnet mask consists of four numeric octets separated by dots. Each octet can be numbered from 000 through 255. Leading zeroes, up to three digits total per octet, are optional. Each octet typically contains either 255 or 0. The octets determine whether or not the same octets of two IP addresses will be compared when determining if two devices are on the same subnet.

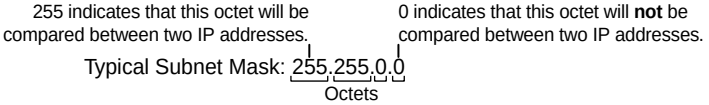

255 indicates that this octet will be compared between two IP addresses.
0 indicates that this octet will **not** be compared between two IP addresses.
Typical Subnet Mask: 255.255.0.0
Octets

Figure A-5 — Subnet mask and octets

Determining whether devices are on the same subnet

To determine the subnet, the local device's IP address is **compared** to the remote device's IP address (figure A-6). Each address's octets are **compared** or **not compared**, depending on the value in the related subnet mask octet.

- If a subnet mask octet contains the value 255, the related octets of the local device's address and the remote device's IP address are unmasked.

  Unmasked octets are compared (indicated by ***?*** in figure A-6).

- If the subnet mask octet contains the value 0, the related octets of the local device's and remote device's IP addresses are masked.

  Masked octets are not compared (indicated by ***X*** in figure A-6).

If the unmasked octets of the two IP addresses **match** (indicated by **=** in figure A-6) (example 1), the two addresses **are on the same subnet**.

If the two unmasked fields **do not match** (indicated by ≠ in figure A-6) (example 2 and example 3), the addresses **are not on the same subnet**.

	Example 1	**Example 2**	**Example 3**
Local IP Address:	192.168.254.254	192.168.254.254	192.168.254.254
Subnet Mask:	255.255.0.0 (*?.?.X.X)*	255.255.0.0 (*?.?.X.X)*	255.255.0.0 (*?.?.X.X)*
Remote IP Address:	192.168.2.25	190.190.2.25	192.190.2.25
Match?:	=.=.*X.X* — **Match** (Same subnet)	≠.≠.*X.X* — **No match** (Different subnet)	=.≠.*X.X* — **No match** (Different subnet)

Figure A-6 — Comparing the IP addresses

Ethernet Connection, cont'd

Appendix B

DSP SIS Commnads

Command/Response Table for DSP SIS Commands

DSP SIS commands

Command/Response Table for DSP SIS Commands

Many digital signal processor (DSP) functions; gain (which includes the mic mixes), mutes, group masters, and a protected configuration; can be controlled using SIS commands. These commands follow the same general rules as basic SIS commands, but the variables (Xns) tend to be more complex. Also, a comprehensive understanding of the DSP's audio signal flow is helpful to understanding these commands. Figure B-1 shows the specific DSP processors and the mic mix-points that can be set via SIS commands. The signal flow is described in more detail in "DSP Configurator Program", in chapter 5, "Switcher Software".

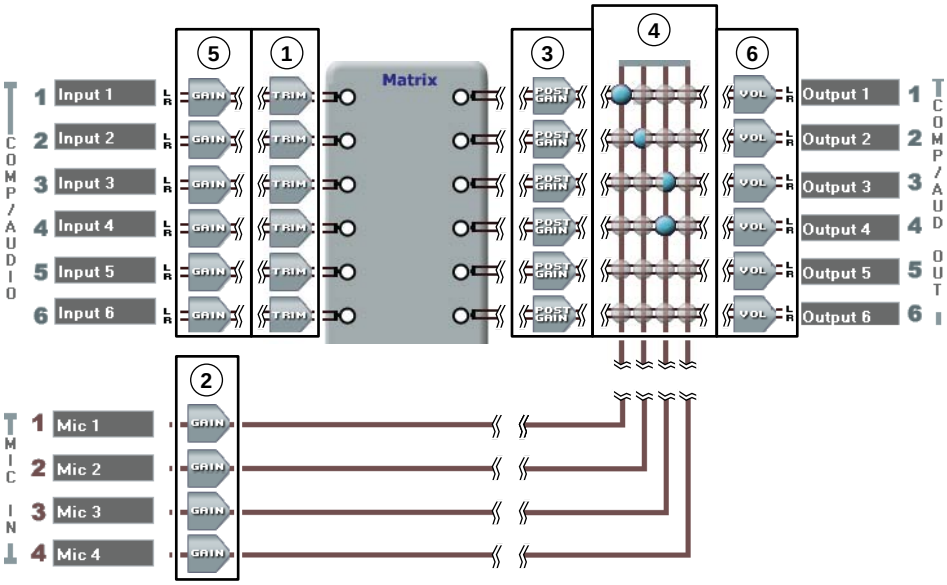


Figure B-1 — DSP processors addressable via SIS commands

1. Program audio input (pre-matrix) trim block
2. Mic/line input gain block
3. Post-matrix gain block
4. Mix-points (and associated built-in mixing controls)
5. Stereo audio input gain block (for group master controls only)
6. Stereo output volume (for group master controls only)

Symbol definitions

↵ = CR/LF (carriage return/line feed) (hex 0D 0A)

← = Carriage return (no line feed, hex 0D)

• = Space character

| = Pipe (vertical bar) character

* = Asterisk character (which is a command character, not a variable)

Esc = Escape key (hex 1B) (use **W** instead of **Esc** for Web browsers)

X60 = Gain control or mic mix-point — See the tables on page B-4 and B-5.

X61 = Level value; pre-matrix (①), post-matrix (③), and mic-mix (④) — See the table on page B-6 through B-8.
-35 dB to + 25 dB, in 0.1 dB increments.
NOTE *Pre-matrix and post-matrix, -12 dB to +12 dB only.*

X62 = Mic/line gain level value — See the table on page B-8.
0 dB to +80 dB, in 1.0 dB increments.

X63 = Mute status
0 = unmute
1 = mute

X64 = Group master group number — 01 – 32 (repeated as X20 in chapter 4,"SIS Programming and Control")

X65 = Group fader setting — dB value, in 0.1 dB increments. The valid range depends on the type of gain block that is assigned to the group number (X64) specified in the command:
① = -120 to +120 (-12.dB to +12.0 dB)
② = 000 to 800 (0.00 dB to 80.0 dB)
③ = -1,000 to +120 (-100.0 dB to +12.0 dB)
④ = -350 to + 250 (-35.0 dB to + 25.0 dB)
⑤ = -180 to +240 (-18.0 dB to +24.0 dB)
⑥ = -640 to 000 (-64.0 dB to 0.00 dB)

X66 = Group fader offset — dB value, in 0.1 dB increments, to raise or lower a group fader

X67 = Group fader soft limit — dB value, in 0.1 dB increments. The valid range must be within the range for the gain block grouped in X65.

X68 = Group type — 6= gain (① through ④) 12 = mute
18 = gain (⑤ and ⑥)

X69 = Personal Identification Number (PIN) — Four numeric digits, default = 0000

X70 = Protected configuration status
0 = no protected configuration saved
1 = protected configuration saved

X60 — *Gain control or mic mix-point*

① Trim control	X60	① Trim control	X60
Input 1, left	30100	Input 1, right	30101
Input 2, left	30102	Input 2, right	30103
Input 3, left	30104	Input 3, right	30105
Input 4, left	30106	Input 4, right	30107
Input 5, left	30108	Input 5, right	30109
Input 6, left	30110	Input 6, right	30111
Input 7, left	30112	Input 7, right	30113
Input 8, left	30114	Input 8, right	30115
Input 9, left	30116	Input 9, right	30117
Input 10, left	30118	Input 10, right	30119
Input 11, left	30120	Input 11, right	30121
Input 12, left	30122	Input 12, right	30123
Input 13, left	30124	Input 13, right	30125
Input 14, left	30126	Input 14, right	30127

② Gain control	X60
Mic/line input 1	40000
Mic/line input 2	40001
Mic/line input 3	40002
Mic/line input 4	40003

③ Post matrix gain control	X60	③ Post matrix gain control	X60
Output 1, left	50000	Output 1, right	50001
Output 2, left	50002	Output 2, right	50003
Output 3, left	50004	Output 3, right	50005
Output 4, left	50006	Output 4, right	50007
Output 5, left	50008	Output 5, right	50009
Output 6, left	50010	Output 6, right	50011

④ Mic mix-point	X60	④ Mic mix-point	X60
Output 1, left, mic 1	21200	Output 1, right, mic 1	21201
Output 1, left, mic 2	21300	Output 1, right, mic 2	21301
Output 1, left, mic 3	21400	Output 1, right, mic 3	21401
Output 1, left, mic 4	21500	Output 1, right, mic 4	21501
Output 2, left, mic 1	21202	Output 2, right, mic 1	21203
Output 2, left, mic 2	21302	Output 2, right, mic 2	21303
Output 2, left, mic 3	21402	Output 2, right, mic 3	21403
Output 2, left, mic 4	21502	Output 2, right, mic 4	21503
Output 3, left, mic 1	21204	Output 3, right, mic 1	21205
Output 3, left, mic 2	21304	Output 3, right, mic 2	21305
Output 3, left, mic 3	21404	Output 3, right, mic 3	21405
Output 3, left, mic 4	21504	Output 3, right, mic 4	21505

④ Mic mix-point	X60	④ Mic mix-point	X60
Output 4, left, mic 1	21206	Output 4, right, mic 1	21207
Output 4, left, mic 2	21306	Output 4, right, mic 2	21307
Output 4, left, mic 3	21406	Output 4, right, mic 3	21407
Output 4, left, mic 4	21506	Output 4, right, mic 4	21507
Output 5, left, mic 1	21208	Output 5, right, mic 1	21209
Output 5, left, mic 2	21308	Output 5, right, mic 2	21309
Output 5, left, mic 3	21408	Output 5, right, mic 3	21409
Output 5, left, mic 4	21508	Output 5, right, mic 4	21509
Output 6, left, mic 1	21210	Output 6, right, mic 1	21211
Output 6, left, mic 2	21310	Output 6, right, mic 2	21311
Output 6, left, mic 3	21410	Output 6, right, mic 3	21411
Output 6, left, mic 4	21510	Output 6, right, mic 4	21511

X60 — *Gain control or mic mix-point (contined)*

⑤ Gain control	X60	⑤ Gain control	X60
Input 1, left	30000	Input 1, right	30001
Input 2, left	30002	Input 2, right	30003
Input 3, left	30004	Input 3, right	30005
Input 4, left	30006	Input 4, right	30007
Input 5, left	30008	Input 5, right	30009
Input 6, left	30010	Input 6, right	30011
Input 7, left	30012	Input 7, right	30013
Input 8, left	30014	Input 8, right	30015
Input 9, left	30016	Input 9, right	30017
Input 10, left	30018	Input 10, right	30019
Input 11, left	30020	Input 11, right	30021
Input 12, left	30022	Input 12, right	30023
Input 13, left	30024	Input 13, right	30025
Input 14, left	30026	Input 14, right	30027

⑥ Volume control	X60	⑥ Volume control	X60
Output 1, left	60000	Output 1, right	60001
Output 2, left	60002	Output 2, right	60003
Output 3, left	60004	Output 3, right	60005
Output 4, left	60006	Output 4, right	60007
Output 5, left	60008	Output 5, right	60009
Output 6 left	60010	Output 6, right	60011

X61 — *Pre-matrix (①), post-matrix (③), and mic mix-point (④) level values*

Mic mix-points (④) only

dB value	X61	dB value	X61	dB value	X61	dB value	X61	dB value	X61	dB value	X61	dB value	X61	dB value	X61	dB value	X61	dB value	X61
																		-35.0	1698
-34.9	1699	-34.8	1700	-34.7	1701	-34.6	1702	-34.5	1703	-34.4	1704	-34.3	1705	-34.2	1706	-34.1	1707	-34.0	1708
-33.9	1709	-33.8	1710	-33.7	1711	-33.6	1712	-33.5	1713	-33.4	1714	-33.3	1715	-33.2	1716	-33.1	1717	-33.0	1718
-32.9	1719	-32.8	1720	-32.7	1721	-32.6	1722	-32.5	1723	-32.4	1724	-32.3	1725	-32.2	1726	-32.1	1727	-32.0	1728
-31.9	1729	-31.8	1730	-31.7	1731	-31.6	1732	-31.5	1733	-31.4	1734	-31.3	1735	-31.2	1736	-31.1	1737	-31.0	1738
-30.9	1739	-30.8	1740	-30.7	1741	-30.6	1742	-30.5	1743	-30.4	1744	-30.3	1745	-30.2	1746	-30.1	1747	-30.0	1748
-29.9	1749	-29.8	1750	-29.7	1751	-29.6	1752	-29.5	1753	-29.4	1754	-29.3	1755	-29.2	1756	-29.1	1757	-29.0	1758
-28.9	1759	-28.8	1760	-28.7	1761	-28.6	1762	-28.5	1763	-28.4	1764	-28.3	1765	-28.2	1766	-28.1	1767	-28.0	1768
-27.9	1769	-27.8	1770	-27.7	1771	-27.6	1772	-27.5	1773	-27.4	1774	-27.3	1775	-27.2	1776	-27.1	1777	-27.0	1778
-26.9	1779	-26.8	1780	-26.7	1781	-26.6	1782	-26.5	1783	-26.4	1784	-26.3	1785	-26.2	1786	-26.1	1787	-26.0	1788
-25.9	1789	-25.8	1790	-25.7	1791	-25.6	1792	-25.5	1793	-25.4	1794	-25.3	1795	-25.2	1796	-25.1	1797	-25.0	1798
-24.9	1799	-24.8	1800	-24.7	1801	-24.6	1802	-24.5	1803	-24.4	1804	-24.3	1805	-24.2	1806	-24.1	1807	-24.0	1808
-23.9	1809	-23.8	1810	-23.7	1811	-23.6	1812	-23.5	1813	-23.4	1814	-23.3	1815	-23.2	1816	-23.1	1817	-23.0	1818
-22.9	1819	-22.8	1820	-22.7	1821	-22.6	1822	-22.5	1823	-22.4	1824	-22.3	1825	-22.2	1826	-22.1	1827	-22.0	1828
-21.9	1829	-21.8	1830	-21.7	1831	-21.6	1832	-21.5	1833	-21.4	1834	-21.3	1835	-21.2	1836	-21.1	1837	-21.0	1838
-20.9	1839	-20.8	1840	-20.7	1841	-20.6	1842	-20.5	1843	-20.4	1844	-20.3	1845	-20.2	1846	-20.1	1847	-20.0	1848
-19.9	1849	-19.8	1850	-19.7	1851	-19.6	1852	-19.5	1853	-19.4	1854	-19.3	1855	-19.2	1856	-19.1	1857	-19.0	1858
-18.9	1859	-18.8	1860	-18.7	1861	-18.6	1862	-18.5	1863	-18.4	1864	-18.3	1865	-18.2	1866	-18.1	1867	-18.0	1868
-17.9	1869	-17.8	1870	-17.7	1871	-17.6	1872	-17.5	1873	-17.4	1874	-17.3	1875	-17.2	1876	-17.1	1877	-17.0	1878
-16.9	1879	-16.8	1880	-16.7	1881	-16.6	1882	-16.5	1883	-16.4	1884	-16.3	1885	-16.2	1886	-16.1	1887	-16.0	1888
-15.9	1889	-15.8	1890	-15.7	1891	-15.6	1892	-15.5	1893	-15.4	1894	-15.3	1895	-15.2	1896	-15.1	1897	-15.0	1898
-14.9	1899	-14.8	1900	-14.7	1901	-14.6	1902	-14.5	1903	-14.4	1904	-14.3	1905	-14.2	1906	-14.1	1907	-14.0	1908
-13.9	1909	-13.8	1910	-13.7	1911	-13.6	1912	-13.5	1913	-13.4	1914	-13.3	1915	-13.2	1916	-13.1	1917	-13.0	1918
-12.9	1919	-12.8	1920	-12.7	1921	-12.6	1922	-12.5	1923	-12.4	1924	-12.3	1925	-12.2	1926	-12.1	1927		

X61 — *Pre-matrix (①), post-matrix (③), and mic mix-point (④) level values, continued*

Pre-matrix (①), post-matrix (③), and mic mix-points (④)

dB value	X61	dB value	X61	dB value	X61	dB value	X61	dB value	X61	dB value	X61	dB value	X61	dB value	X61	dB value	X61	dB value	X61
																		-12.0	1928
-11.9	1929	-11.8	1930	-11.7	1931	-11.6	1932	-11.5	1933	-11.4	1934	-11.3	1935	-11.2	1936	-11.1	1937	-11.0	1938
-10.9	1939	-10.8	1940	-10.7	1941	-10.6	1942	-10.5	1943	-10.4	1944	-10.3	1945	-10.2	1946	-10.1	1947	-10.0	1948
-9.9	1949	-9.8	1950	-9.7	1951	-9.6	1952	-9.5	1953	-9.4	1954	-9.3	1955	-9.2	1956	-9.1	1957	-9.0	1958
-8.9	1959	-8.8	1960	-8.7	1961	-8.6	1962	-8.5	1963	-8.4	1964	-8.3	1965	-8.2	1966	-8.1	1967	-8.0	1968
-7.9	1969	-7.8	1970	-7.7	1971	-7.6	1972	-7.5	1973	-7.4	1974	-7.3	1975	-7.2	1976	-7.1	1977	-7.0	1978
-6.9	1979	-6.8	1980	-6.7	1981	-6.6	1982	-6.5	1983	-6.4	1984	-6.3	1985	-6.2	1986	-6.1	1987	-6.0	1988
-5.9	1989	-5.8	1990	-5.7	1991	-5.6	1992	-5.5	1993	-5.4	1994	-5.3	1995	-5.2	1996	-5.1	1997	-5.0	1998
-4.9	1999	-4.8	2000	-4.7	2001	-4.6	2002	-4.5	2003	-4.4	2004	-4.3	2005	-4.2	2006	-4.1	2007	-4.0	2008
-3.9	2009	-3.8	2010	-3.7	2011	-3.6	2012	-3.5	2013	-3.4	2014	-3.3	2015	-3.2	2016	-3.1	2017	-3.0	2018
-2.9	2019	-2.8	2020	-2.7	2021	-2.6	2022	-2.5	2123	-2.4	2024	-2.3	2025	-2.2	2026	-2.1	2027	-2.0	2028
-1.9	2029	-1.8	2030	-1.7	2031	-1.6	2032	-1.5	2033	-1.4	2034	-1.3	2035	-1.2	2036	-1.1	2037	-1.0	2038
-0.9	2039	-0.8	2040	-0.7	2041	-0.6	2042	-0.5	2043	-0.4	2044	-0.3	2045	-0.2	2046	-0.1	2047	0.0	2048
+0.1	2049	+0.2	2050	+0.3	2051	+0.4	2052	+0.5	2053	+0.6	2054	+0.7	2055	+0.8	2056	+0.9	2057	+1.0	2058
+1.1	2059	+1.2	2060	+1.3	2061	+1.4	2062	+1.5	2063	+1.6	2064	+1.7	2065	+1.8	2066	+1.9	2067	+2.0	2068
+2.1	2069	+2.2	2070	+2.3	2071	+2.4	2072	+2.5	2073	+2.6	2074	+2.7	2075	+2.8	2076	+2.9	2077	+3.0	2078
+3.1	2079	+3.2	2080	+3.3	2081	+3.4	2082	+3.5	2083	+3.6	2084	+3.7	2085	+3.8	2086	+3.9	2087	+4.0	2088
+4.1	2089	+4.2	2090	+4.3	2091	+4.4	2092	+4.5	2093	+4.6	2094	+4.7	2095	+4.8	2096	+4.9	2097	+5.0	2098
+5.1	2199	+5.2	2100	+5.3	2101	+5.4	2102	+5.5	2103	+5.6	2104	+5.7	2105	+5.8	2106	+5.9	2107	+6.0	2108
+6.1	2109	+6.2	2110	+6.3	2111	+6.4	2112	+6.5	2113	+6.6	2114	+6.7	2115	+6.8	2116	+6.9	2117	+7.0	2118
+7.1	2119	+7.2	2120	+7.3	2121	+7.4	2122	+7.5	2123	+7.6	2124	+7.7	2125	+7.8	2126	+7.9	2127	+8.0	2128
+8.1	2129	+8.2	2130	+8.3	2131	+8.4	2132	+8.5	2133	+8.6	2134	+8.7	2135	+8.8	2136	+8.9	2137	+9.0	2138
+9.1	2139	+9.2	2140	+9.3	2141	+9.4	2142	+9.5	2143	+9.6	2144	+9.7	2145	+9.8	2146	+9.9	2147	+10.0	2148
+10.1	2149	+10.2	2150	+10.3	2151	+10.4	2152	+10.5	2153	+10.6	2154	+10.7	2155	+10.8	2156	+10.9	2157	+11.0	2158
+11.1	2159	+11.2	2160	+11.3	2161	+11.4	2162	+11.5	2163	+11.6	2164	+11.7	2165	+11.8	2166	+11.9	2167	+12.0	2168

X61 — *Pre-matrix (①), post-matrix (③), and mic mix-point (④) level values, continued*

Mic mix-points (④) only

dB value	X61	dB value	X61	dB value	X61	dB value	X61	dB value	X61	dB value	X61	dB value	X61	dB value	X61	dB value	X61	dB value	X61
+12.1	2169	+12.2	2170	+12.3	2171	+12.4	2172	+12.5	2173	+12.6	2174	+12.7	2175	+12.8	2176	+12.9	2177	+13.0	2178
+13.1	2179	+13.2	2180	+13.3	2181	+13.4	2182	+13.5	2183	+13.6	2184	+13.7	2185	+13.8	2186	+13.9	2187	+14.0	2188
+14.1	2189	+14.2	2190	+14.3	2191	+14.4	2192	+14.5	2193	+14.6	2194	+14.7	2195	+14.8	2196	+14.9	2197	+15.0	2198
+15.1	2199	+15.2	2200	+15.3	2201	+15.4	2202	+15.5	2203	+15.6	2204	+15.7	2205	+15.8	2206	+15.9	2207	+16.0	2208
+16.1	2209	+16.2	2210	+16.3	2211	+16.4	2212	+16.5	2213	+16.6	2214	+16.7	2215	+16.8	2216	+16.9	2217	+17.0	2218
+17.1	2219	+17.2	2220	+17.3	2221	+17.4	2222	+17.5	2223	+17.6	2224	+17.7	2225	+17.8	2226	+17.9	2227	+18.0	2228
+18.1	2229	+18.2	2230	+18.3	2231	+18.4	2232	+18.5	2233	+18.6	2234	+18.7	2235	+18.8	2236	+18.9	2237	+19.0	2238
+19.1	2239	+19.2	2240	+19.3	2241	+19.4	2242	+19.5	2243	+19.6	2244	+19.7	2245	+19.8	2246	+19.9	2247	+20.0	2248
+20.1	2249	+20.2	2250	+20.3	2251	+20.4	2252	+20.5	2253	+20.6	2254	+20.7	2255	+20.8	2256	+20.9	2257	+21.0	2258
+21.1	2259	+21.2	2260	+21.3	2261	+21.4	2262	+21.5	2263	+21.6	2264	+21.7	2265	+21.8	2266	+21.9	2267	+22.0	2268
+22.1	2269	+22.2	2270	+22.3	2271	+22.4	2272	+22.5	2273	+22.6	2274	+22.7	2275	+22.8	2276	+22.9	2277	+23.0	2278
+23.1	2279	+23.2	2280	+23.3	2281	+23.4	2282	+23.5	2283	+23.6	2284	+23.7	2285	+23.8	2286	+23.9	2287	+24.0	2288
+24.1	2289	+24.2	2290	+24.3	2291	+24.4	2292	+24.5	2293	+24.6	2294	+24.7	2295	+24.8	2296	+24.9	2297	+25.0	2298

X62 — *Mic/line input level values*

dB value	X62	dB value	X62	dB value	X62	dB value	X62	dB value	X62	dB value	X62	dB value	X62	dB value	X62	dB value	X62	dB value	X62
																		0.0	2048
1.0	2058	2.0	2068	3.0	2078	4.0	2088	5.0	2098	6.0	2108	7.0	2128	8.0	2128	9.0	2138	10.0	2148
11.0	2158	12.0	2168	13.0	2178	14.0	2188	15.0	2198	16.0	2208	17.0	2218	18.0	2228	19.0	2238	20.0	2248
21.0	2258	22.0	2268	23.0	2278	24.0	2288	25.0	2298	26.0	2308	27.0	2318	28.0	2328	29.0	2348	30.0	1958
31.0	2358	32.0	2368	33.0	2378	34.0	2388	35.0	2398	36.0	2408	37.0	2418	38.0	2428	39.0	2438	40.0	2448
41.0	2458	42.0	2468	43.0	2478	44.0	2488	45.0	2498	46.0	2508	47.0	2518	48.0	2528	49.0	2538	50.0	2548
51.0	2558	52.0	2568	53.0	2578	54.0	2588	55.0	2598	56.0	2608	57.0	2618	58.0	2628	59.0	2638	60.0	2648
61.0	2658	62.0	2668	63.0	2678	64.0	2688	65.0	2698	66.0	2708	67.0	2718	68.0	2728	69.0	2738	70.0	2748
71.0	2758	72.0	2768	73.0	2778	74.0	2788	75.0	2798	76.0	2808	77.0	2818	78.0	2828	79.0	2838	80.0	2848

Command/response table for DSP SIS commands

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Audio trim, gain, and mixing			
NOTE • *The DSP level adjustments are completely separate from the input gain and attenuation (G and g commands) and the output volume (V) commands available in the basic SIS commands.* • *The command format is the same, regardless of the control or mix-point that is to be set; the acceptable adjustment range varies depending on the control or mix-point:* ❍ *The program audio input (pre-matrix) trim range is -12 dB to +12 dB, in 0.1 dB increments.* ❍ *The mic/line input gain range is 0 dB to 80 dB, in 1.0 dB increments.* ❍ *The post-matrix level trim is -12 dB to +12 dB, in 0.1 dB increments.* ❍ *The mic mix-points (with their associated mixing controls) range is -35 dB to +25 dB, in 0.1 dB increments.* • *All responses are shown with the matrix switcher in Verbose mode 2 or 3.*			
Set a DSP trim or mix (excluding mic/line inputs)	Esc G X60 * X61 AU ←	DsG X60 * X61 ↵	Set DSP trim or mix control X60 to a value of X61 dB.
Example 1 (trim control):	Esc G30124*2040AU ←	DsG30124*2040 ↵	Set the input 13, left audio trim to a value of -0.8 dB.
Example 2 (mix control):	Esc G21308*2213AU ←	DsG21308*2213 ↵	Mix +16.5 dB of mic 2 into output 5, left.
Set a mic/line gain	Esc G X60 * X62 AU ←	DsG X60 * X62 ↵	Set mic/line gain control X60 to a value of X62 dB.
Example:	Esc G40001*2288AU ←	DsG40001*2288 ↵	Set the mic/line input 2 gain to a level of +24.0 dB.
Read a DSP trim or mix (excluding mic/line inputs)	Esc G X60 AU ←	DsG X60 * X61 ↵	DSP trim or mix control X60 is set to a value of X61 dB.
Example 1 (post matrix gain control):	Esc G50007AU ←	DsG50007*2103 ↵	Output 4, post matrix gain is set to a value of +5.5 dB.
Example 2 (mix control):	Esc G21211AU ←	DsG21211*2140 ↵	+9.2 dB of mic 1 is mixed into output 6, right.
Read a mic/line gain	Esc G X60 AU ←	DsG X60 * X62 ↵	Mic/line gain control X60 is set to a value of X62 dB.
Example:	Esc G40000AU ←	DsG40000*2598 ↵	Mic/line input 1 gain is set to a value of +55.0 dB.
Audio mute			
NOTE • *Only mic/line input gain blocks (②) and mic mix-points (④) can be muted.* • *All responses are shown with the matrix switcher in Verbose mode 2 or 3.*			
Audio mute	Esc M X60 *1AU ←	DsM X60 *1 ↵	Mute audio point X60.
Example:	Esc M21410*1AU ←	DsM21410*1 ↵	Mute output 6, left, mic 3.
Audio unmute	Esc M X60 *0AU ←	DsM X60 *0 ↵	Unmute audio point X60.
Read audio mute or level	Esc M X60 AU ←	DsM X60 * X63 ↵	X63: 0 = mute off, 1 = mute on.

NOTE

X60 = Gain control or mic mix-point	See the tables on page B-4 and B-5.	
X61 = Level value	See the tables on page B-6 through B-8.	
X62 = Mic/line gain level value	See the table on page B-8.	
X63 = Mute status	0 = unmute	1 = mute

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Audio group master commands			
NOTE • *See "Group masters", in chapter 5, "Switcher Software", for more information about audio group masters.* • *You must have assigned members to a group for these commands to have an effect.* • *For X65, a positive (+) value is assumed unless you specify otherwise (-).* • *If you enter a X65 value that is outside the valid range for the group **or** outside the soft limits, the switcher responds with an "invalid parameter" (E13) error.* • *X65, X66, and X67 values can be sent without leading zeroes; responses are alway 5 digits.*			
Set a group fader control	Esc D X64 * X65 GRPM ↵	Grpm X64 * X65 ↵	Set the group fader to a value of X65.
Example:	Esc d2*-293*GRPM ↵	GrpmD02*-00293*GRPM ↵	Set the group 2 fader control to -29.3 dB.
Raise a group fader control	Esc D X64 * X66 +GRPM ↵	Grpm X64 * X65 ↵	Increase the level of the X64 group fader by X66 dB.
Example	Esc d2*30+GRPM ↵	GrpmD02*-00263*GRPM ↵	Raise the group 2 fader 3 dB (from -29.3 dB to -26.3 dB, starting from the level set in the "Set a group fader control" example, above.
Lower a group fader control	Esc D X64 * X66 -GRPM ↵	Grpm X64 * X65 ↵	Decrease the level of the X64 group fader by X66 dB.
View the group fader control level	Esc D X64 GRPM ↵	Grpm X64 * X65 ↵	In verbose modes 1 and 2, the response is simplified to X65 ↵.
Mute a group mute control	Esc D X64 *1GRPM ↵	GrpmD X64 *+00001 ↵	Mute all blocks in group X64.
Clear (unmute) a group mute control	Esc D X64 *0GRPM ↵	GrpmD X64 *+00000 ↵	Umute all blocks in group X64.
View a group mute control	Esc D X64 GRPM ↵	GrpmD X64 * X63 ↵	For group masters, X63 is always expresed as a positive, 5-digit value.
Set soft limits	Esc L X64 * X67 upper * X67 lower GRPM ↵	GrpmL X64 * X67 * X67 ↵	Set the groups soft limits to X67 and X67.
Example:	Esc L2*-48*-630GRPM ↵	GrpmL02*-00048*-00630 ↵	Set the upper soft limit for the group 2 fader to -4.8 dB and the lower limit to -63 dB.
View soft limits	Esc L X64 GRPM ↵	GrpmL X64 * X67 * X67 ↵	In verbose modes 1 and 2, the response is simplified to X67 * X67 ↵.
View group type	Esc P X64 GRPM ↵	GrpmP X64 * X68 ↵	Show the group type (X68) for group X64. In verbose modes 1 and 2, the response is simplified to X68 ↵.
View group members	Esc O X64 GRPM ↵	GrpmO X64 * X60 1 * X60 2 *...* X60 16 ↵	X60 is the control or mix point. In verbose modes 1 and 2, the response is simplified to X60 1 * X60 2 *...* X60 16 ↵.
Reset a group	Esc Z X64 GRPM ↵	GrpmZ X64 ↵	Delete all members from group X64, reset parameters and soft limits.

NOTE

X60 = Gain control or mic mix-point	See the tables on page B-4 and B-5.	
X63 = Mute status	0 = unmute	1 = mute
X64 = Group master group number	01 - 32	
X65, X66, X67 = Group fader soft limit	dB value, in 0.1 dB increments, see page B-3.	
X68 = Group type (see figure B-1)	6= gain (① through ④)	12 = mute
	18 = gain (⑤ and ⑥)	

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Protected configuration			
NOTE *The MPX Plus 866 A can save and recall a Personal Identification Number (PIN)-protected configuration, including all presets, mic mixes, parameters, variables, and values (with the exception of the switcher's IP address). The protected configuration is useful to establish the MPX Plus 866 A in a known state, either as a troubleshooting tool or as a baseline configuration.*			
Save the configuration	Esc S X69 PCFG ←	PcfgS ↵	Save the configuration to the protected memory location.
Recall the configuration	Esc RPCFG ←	PcfgR ↵	Recall the protected configuration
Change the PIN	Esc P X69^{old} * X69^{new} PCFG ←	PcfgP X69{new} ↵	Overwrite the old PIN (X69^{old}) with the new one (X69^{new}).
Query configuration saved status	Esc QPCFG ←	X70 ↵	

NOTE X69 = PIN number *nnnn* (default = 0000)
X70 = Saved status 0 = not saved 1 = saved

Appendix C

Reference Information

Specifications

Part Numbers

Reference Information

Specifications

Video

Routing
- RGB/VGA ..... 8 x 6 matrix
- S-video/composite video. 6 x 6 matrix

Gain ..... Unity

Bandwidth
- RGB/VGA ..... 300 MHz (-3 dB), fully loaded
- S-video/composite video. 150 MHz (-3 dB), fully loaded
  - 0 - 10 MHz ..... No more than +0.1 dB to -0.1 dB
  - 0 - 30 MHz ..... No more than +0.1 dB to -0.5 dB

Differential phase error ..... 1.0° at 3.58 MHz and 4.43 MHz

Differential gain error ..... 1.0% at 3.58 MHz and 4.43 MHz

Crosstalk
- RGB/VGA ..... <-50 dB @ 10 MHz, <-30 dB @ 100 MHz
- S-video/composite video. -50 dB @ 5 MHz

Switching speed ..... 100 ms (max.)

Video input

Number/signal type
- RGB/VGA ..... 8 VGA-QXGA RGBHV, RGBS, RGsB, RsGsBs, component video
- S-video/composite video. Up to 4 S-video and 2 composite video
  or
  6 composite video

Connectors
- RGB/VGA ..... 8 female 15-pin HD
- S-video/composite video. 4 x 2 female BNC for S-video or composite video (inputs 11 to 14) and 2 x 1 female BNC for composite video or genlock only (inputs 9 and 10)

Nominal level ..... 1 Vp-p for Y of component video or S-video and for composite video
0.7 Vp-p for RGB and for R-Y and B-Y of component video
0.3 Vp-p for C of S-video

Minimum/maximum levels
- RGB/VGA ..... Analog: 0.3 V to 1.5 Vp-p with no offset
- S-video/composite video. Analog: 0.5 V to 2.0 Vp-p with no offset

Impedance ..... 75 ohms

Return loss
- RGB/VGA ..... <-40 dB @ 5 MHz
- S-video/composite video. <-30 dB @ 5 MHz

DC offset (max. allowable, S-video or composite video)
1.5 V

External sync (genlock, S-video or composite video)
0.3 V to 0.4 Vp-p

Video output

Number/signal type

RGB/VGA	6 VGA-QXGA RGBHV, RGBS, RGsB, RsGsBs, (follows input type)
S-video/composite video.	2 S-video, 2 S-video or composite video, and 2 composite video

Connectors

RGB/VGA	6 female 15-pin HD
S-video/composite video.	2 x 2 female BNC for S-video only (outputs 9 and 10) 2 x 2 female BNC for S-video or composite video pass-through (outputs 11 and 12) 2 x 1 female BNC for composite video only (outputs 7 and 8)
Nominal level	1 Vp-p for Y of component video or S-video and for composite video 0.7 Vp-p for RGB and for R-Y and B-Y of component video 0.3 Vp-p for C of S-video

Minimum/maximum levels

RGB/VGA	Analog: 0.3 V to 1.5 Vp-p with no offset (follows input)
S-video/composite video.	Analog: 0.0 V to 2.0 Vp-p with no offset
Impedance	75 ohms

Return loss

RGB/VGA	-40 dB @ 5 MHz
S-video/composite video.	-30 dB @ 5 MHz

DC offset

S-video/composite video.	±5 mV with input at 0 offset
VGA	±10 mV with input at 0 offset

Switching type

RGB/VGA	Triple-Action
S-video/composite video.	Vertical interval

Sync

Input type (VGA group)	RGBHV, RGBS, RGsB, RsGsBs
Output type (VGA group)	RGBHV, RGBS, RGsB, RsGsBs (follows input)
Horizontal frequency (RGB)	15 kHz to 145 kHz
Vertical frequency (RGB)	30 Hz to 170 Hz
Genlock connector	1 BNC female (video input 9)
Standards (S-video and composite video groups)	NTSC 3.58, NTSC 4.43, PAL, SECAM
Input level	1.9 V to 5.0 Vp-p
Output level	TTL: 5.0 Vp-p, unterminated for RGBHV, RGBS
Input impedance	510 ohms
Output impedance	75 ohms
Max. input voltage	5.0 Vp-p
Max. propagation delay	<65 ns
Polarity	Positive or negative (follows input)

Audio

Routing	14 x 6 stereo switching matrix 4 x 6 microphone mixing matrix
Gain	Unbalanced output: -6 dB; balanced output: 0 dB
Frequency response	20 Hz to 20 kHz, ±0.15 dB
THD + Noise	0.01% @ 1 kHz at nominal level
S/N	>105 dB, balanced, at maximum output (21 dBu) (unweighted)
Crosstalk	<-90 dB @ 1 kHz, fully loaded
Stereo channel separation	>96 dB @ 1 kHz
CMRR	>70 dB @ 1 kHz
Volume range	-100 dB to 0 dB (volume numbers 0 to 64 in 1.0 dB steps, except from step 0 to 1, which is a 37 dB step)

NOTE *Full attenuation is volume level 0, -100 dB. The default is -0 dB, volume level 64.*

Audio input

Number/signal type	14 stereo or mono, balanced/unbalanced
Connectors	(14) 3.5 mm captive screw connectors, 5 pole
Impedance	>11.5k ohms unbalanced, 22k ohms balanced, DC coupled
Nominal level	+4 dBu (1.23 Vrms)
Maximum level	+24 dBu at 1% THD+N
Input gain adjustment	–18 dB to +24 dB, adjustable per input by RS-232, Ethernet, or front panel

NOTE *0 dBu = 0.775 Vrms, 0 dBV = 1 Vrms, 0 dBV ≈ 2 dBu*

Mic/line input

Number/signal type	4 balanced/unbalanced
Connectors	(4) 3.5 mm captive screw connectors, 3 pole
Impedance	>2.5k ohms unbalanced, >5.0k ohms balanced
Nominal level	-60 dBV (1 mVrms) when Mic gain is set to +40 dB
Equivalent input noise	<-120 dBV (1.0 µVrms) when Mic gain is set to +40 dB
Maximum level	+12 dBV (2 Vrms) at 1% THD+N when Mic gain is set to 0 dB
Input gain adjustment	0 dB to +80 dB, adjustable per input
Mic DC power	+48 VDC (can be switched on or off)

Audio output

Number/signal type	6 stereo or mono, balanced/unbalanced
Connectors	(6) 3.5 mm captive screw connectors, 5 pole
Impedance	50 ohms unbalanced, 100 ohms balanced
Gain error	±0.10 dB channel to channel
Maximum level (Hi-Z)	>+21 dBu, balanced; or +15 dBu, unbalanced at 1% THD+N

Control/remote — switcher

Serial host control port	(2) RS-232: 2 rear panel 3.5 mm captive screw connectors, 3 pole; 1 front panel 2.5 mm stereo mini jack (Either this or the rear panel secondary port is active, not both at the same time.)
Baud rate and protocol	9600 baud; 8 data bits, 1 stop bit, no parity
Serial control pin configurations	Captive screw connectors: 1 = TX, 2 = RX, 3 = GND Mini stereo jack: tip = TX, ring = RX, sleeve = GND
Ethernet host control port	1 RJ-45 female connector
Ethernet data rate	10/100Base-T, half/full duplex with autodetect
Ethernet protocol	ARP, DHCP, ICMP (ping), TCP/IP, Telnet, HTTP, SMTP
Default settings	Link speed and duplex level = autodetected IP address = 192.168.254.254 Subnet mask = 255.255.0.0 Gateway = 0.0.0.0 DHCP = off
Web server	Up to 200 simultaneous sessions 7.25 MB nonvolatile user memory
Program control	Extron's control/configuration program for Windows® Extron's Simple Instruction Set (SIS™) Microsoft® Internet Explorer, ver. 6 or higher, Telnet

General

Power	100 VAC to 240 VAC, 50-60 Hz, 48 watts, internal
Temperature/humidity	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing
Cooling	Convection, vents on left and right sides
Mounting	
Rack mount	Yes
Enclosure type	Metal
Enclosure dimensions	3.5" H x 17.0" W x 9.4" D (2U high, full rack wide) (8.9 cm H x 43.2 cm W x 23.9 cm D) (Depth excludes connectors. Width excludes rack ears.)
Product weight	15 lbs (6.8 kg)
Shipping weight	25 lbs (12 kg)
DIM weight	TBD
Vibration	ISTA 1A in carton (International Safe Transit Association)
Regulatory compliance	
Safety	CE, c-UL, UL
EMI/EMC	CE, C-tick, FCC Class A, ICES, VCCI
MTBF	30,000 hours
Warranty	3 years parts and labor

NOTE *All nominal levels are at ±10%.*

NOTE *Specifications are subject to change without notice.*

Part Numbers and Accessories

Included parts

Model	Part number
MPX 866 A Media Presentation Matrix Switcher	60-796-01
5-pole captive screw audio connectors (qty. 20)	10-703-12LF
3-pole captive screw serial connectors (qty. 2)	10-703-11LF
Extron Software Products Disk (DSP Configurator, Matrix Switchers Control Program, and Button-Label Generator)	
MPX Plus 866 A Media Presentation Matrix Switcher User's Manual	

Replacement parts

Included parts	Part number
Button and cap diffuser kit	70-352-01
Button overlays	100-196-01
5-pole captive screw audio connectors (qty. 10)	100-460-01

Optional accessories

These items can be ordered separately:

Adapters, power supplies, labels	Part number
MKP 1000 remote keypad	
Black	60-239-02
White	60-239-03
WT (water-tight) (black)	60-239-52
WT (white)	60-239-53
MCP 1000M (master)	60-298-01
MCP 1000S (slave)	60-298-02
MKP 2000 matrix switcher X-Y remote control panel	
Black	60-682-02
White	60-682-03
MKP 3000	
Black	60-708-02
White	60-708-03
MKP 3000 MAAP	
Black	60-709-02
White	60-709-03
MKP 3000 L (lectern mounted)	60-709-22

Cables

When using signals with a scanning frequency of 15-125 kHz and running distances of 100 feet or more, use high resolution BNC cables to achieve maximum performance.

Bulk cable and termination tools

MHR mini high resolution cable	Part number
MHRVGA/500 non-plenum 5-conductor, 500' (150 m)	22-024-01
MHRVGA/1000 non-plenum 5-conductor, 1000' (300 m)	22-024-03
MHRVGAP/500 plenum 5-conductor, 500' (150 m)	22-131-02
MHRVGAP/1000 plenum 5-conductor, 1000' (300 m)	22-131-03
MHR-2/250 non-plenum 2-conductor, 250' (75m)	22-123-02
MHR-2/500 non-plenum 2-conductor, 500' (150 m)	22-123-03
MHR-2P/250 plenum 2-conductor, 250' (75m)	22-129-02
MHR-2P/500 plenum 2-conductor, 500' (150 m)	22-129-03

RG6 super high resolution cable	Part number
RG6/500 non-plenum 1-conductor, 500' (150 m)	22-098-02
RG6-1000 non-plenum 1-conductor, 1000' (300 m)	22-098-03
RG6P/500 plenum 1-conductor, 500' (150 m)	22-164-02
RG6P/1000 plenum 1-conductor, 1000' (300 m)	22-164-03

Termination tools and connectors	Part number
15-pin HD connectors, (VGA style), qty. 10	100-070-51
CTU 200 universal crimp tool	100-241-01
MHR universal crimp term. kit (100 MHR BNC connectors)	100-266-01
RG6 universal crimp term. kit (100 RG6 BNC connectors)	100-267-01
CTU 100 universal compression tool (BNC, F, RCA)	100-181-01
MHR BNC compression kit (100 MHR BNC connectors)	60-538-01
RG6 BNC compression kit (100 RG6 BNC connectors)	60-538-02

Terminated cable assemblies

VGA male-to-male cables	
VGA M-M MD, 3' to 100' (0.9 m to 30.4 m) (molded)	26-238-*nn*
VGA M-M BK, 3' to 100' (0.9 m to 30.4 m) (backshell)	26-238-*nn*
VGAP M-M MD, 3' to 25' (0.9 m to 7.6 m) (molded)	26-439-*nn*
VGAP M-M BK, 35' to 100' (10.6 m to 30.4 m) (backshell)	26-439-*nn*

VGA male-to-male with audio cables	Part number
VGA-A M-M MD, 3' to 100' (0.9 m to 30.4 m) (molded)	26-490-*nn*
VGA-A M-M BK, 3' to 100' (0.9 m to 30.4 m) (backshell)	26-490-*nn*
VGA-A 90º M-M MD, 3' to 12' (0.9 m to 3.6 m) (molded)	26-510-*nn*
VGA-A 90º M-M BK, 3' to 12' (0.9 m to 3.6 m) (backshell)	26-510-*nn*
VGA-A 90º Up M-M MD, 3' to 12' (0.9 m to 3.6 m) (molded)	26-510-*nn*
VGA-A 90º Up M-M BK 3' to 12' (0.9 m to 3.6 m) (backshell)	26-510-*nn*

VGA male-to-female cables	Part number
VGA M-F MD, 3' to 100' (0.9 m to 30.4 m) (molded)	26-112-*nn*
VGA M-F BK, 3' to 100' (0.9 m to 30.4 m) (backshell)	26-112-*nn*
VGAP M-F MD, plenum 3' to 25' (0.9 m to 7.6 m) (molded)	26-438-*nn*
VGAP M-F BK, plenum 35' to 100' (10.6 m to 30.4 m) (backshell)	26-438 -*nn*

VGA male-to-female with audio cables	Part number
VGA-A M-F MD, 3' to 50' (0.9 m to 15.2 m) (molded)	26-491-*nn*
VGA-A M-F BK, 3' to 50' (0.9 m to 15.2 m) (backshell)	26-491-*nn*
VGA-A 90º M-F MD, 3' to 12' (0.9 m to 3.6 m) (molded)	26-509-*nn*
VGA-A 90º M-F BK, 3' to 12' (0.9 m to 3.6 m) (backshell)	26-509-*nn*
VGA-A 90º Up M-F MD, 3' to 12' (0.9 m to 3.6 m) (molded)	26-509-*nn*
VGA-A 90º Up M-F BK 3' to 12' (0.9 m to 3.6 m) (backshell)	26-509-*nn*

S-video cables	Part number
MHR-2 SVM-M, 6' to 100' (1.8 m to 30.4 m)	26-316-*nn*
MHR-2P SVM-M, Plenum, 6' to 100' (0.9 m to 30.4 m))	26-522-*nn*

S-video/BNC adapters	Part number
SVHSF-BNCM, S-video female to BNC male, 1' to 6' (30 cm to 1.8 m)	26-541-*nn*
SVHSF-BNCF, S-video female to BNC female, 8" (20 cm)	26-541-01
SVHSM-BNCF, S-video male to BNC female, 1' to 6' (30 cm to 1.8 m)	26-353-*nn*
SVHSM-BNCF, S-video female to BNC female, , 8" (20 cm)	26-353-01

Composite video male-to-male cables	
RG6 BNC, 3' to 100' (0.9 m to 30.4 m)	26-383-*nn*

Button Labels

Page C-11 provides strips of blank button labels. If desired, photocopy them or cut them out of the manual, write button information in each button area, and put them in the switcher's input or output buttons' windows. You can also create labels using the Button-Label Generator software (see chapter 5, "Switcher Software").

Installing labels in the matrix switcher's buttons

Install new labels in the matrix switcher's front panel buttons as follows:

1. Make new labels using either the blanks on page C-11 or the Button-Label Generator software. Cut them out.

NOTE *For best results, print on transparent or translucent material.*

2. Remove the button from the switcher: use a small, flat bladed screwdriver such as an Extron Tweeker to gently pry a button out from the front panel (figure C-1).

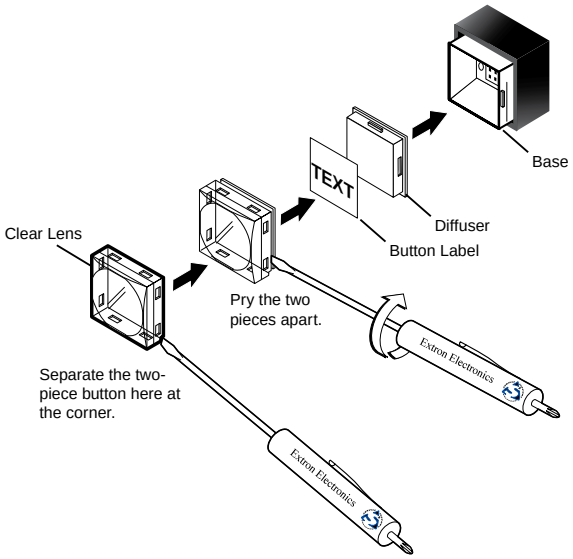
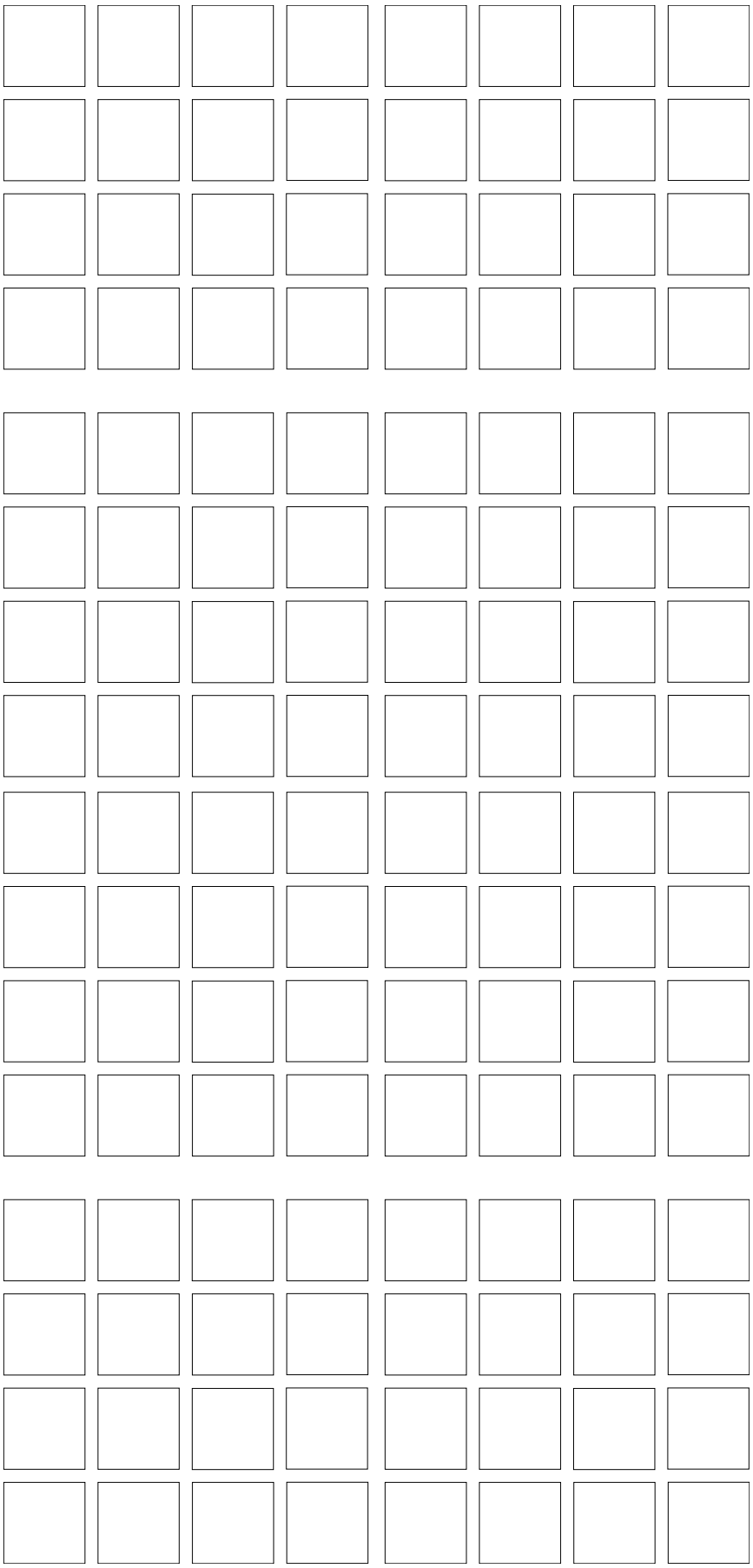


Figure C-1 — Illuminated button label replacement

3. Locate the notch in the corner of one side of the clear button cap lens.
4. Separate the white backing (diffuser) from the clear button cap (lens); insert the blade of the small screwdriver into the corner notch and gently twist the blade.
5. Save the translucent, white diffuser, but remove the text/label insert from the transparent button cap lens.
6. Insert the replacement button label into the button cap. Check for correct label orientation.
7. Align the white diffuser plate with the cap (lens). The bumps on the diffuser plate should be aligned (top and bottom) with the notches on the clear button cap. Firmly snap it into place.
8. Align the tabs on the switcher's plunger with the notches on the diffuser plate. Gently, but firmly, press the reassembled button into place in the switcher's front panel.
9. Repeat steps **2** to **8** as needed to relabel other buttons.



Button label blanks

Extron's Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

USA, Canada, South America, and Central America:
Extron Electronics
1001 East Ball Road
Anaheim, CA 92805
U.S.A.

Japan: Extron Electronics, Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

Europe, Africa, and the Middle East:
Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

China:
Extron China
686 Ronghua Road, Songjiang District
Shanghai 201611
China

Asia:
Extron Asia
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363
Singapore

Middle East:
Extron Middle East
Dubai Airport Free Zone
F12, PO Box 293666
United Arab Emirates, Dubai

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions or non-Extron authorized modification to the product.

If it has been determined that the product is defective, please call Extron and ask for an Applications Engineer at (714) 491-1500 (USA), 31.33.453.4040 (Europe), 65.383.4400 (Asia), or 81.3.3511.7655 (Japan) to receive an RA# (Return Authorization number). This will begin the repair process as quickly as possible.

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

Extron **USA - West**
Headquarters

+800.633.9876
Inside USA / Canada Only

+1.714.491.1500
+1.714.491.1517 FAX

Extron **USA - East**

+800.633.9876
Inside USA / Canada Only

+1.919.863.1794
+1.919.863.1797 FAX

Extron **Europe**

+800.3987.6673
Inside Europe Only

+31.33.453.4040
+31.33.453.4050 FAX

Extron **Asia**

+800.7339.8766
Inside Asia Only

+65.6383.4400
+65.6383.4664 FAX

Extron **Japan**

+81.3.3511.7655
+81.3.3511.7656 FAX

Extron **China**

+400.883.1568
Inside China Only

+86.21.3760.1568
+86.21.3760.1566 FAX

Extron **Middle East**

+971.4.2991800
+971.4.2991880 FAX

© 2009 Extron Electronics. All rights reserved.